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**Reporting from and review of Parties included in Annex I to the Convention**
**Compilation and synthesis of second biennial reports from Parties included in Annex I to the Convention**

# Compilation and synthesis of second biennial reports

**Report by the secretariat**

**Addendum**

*Summary*

This document contains the compilation and synthesis of the second biennial reports submitted to the secretariat by Parties included in Annex I to the Convention. It provides information on a range of issues relating to the implementation of the Convention, such as: quantified economy-wide emission reduction targets and progress made towards their achievement, including information on mitigation actions and their effects and estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry activities; greenhouse gas emission trends and projections; and the provision of financial, technological and capacity-building support to developing country Parties.

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# I. Quantified economy-wide emission reduction targets

## A. Overview

1. Parties included in Annex I to the Convention (Annex I Parties)[1] have to report in their biennial reports (BRs) information describing their quantified economy-wide emission reduction targets (hereinafter referred to as targets), including any conditions or assumptions that are relevant to the attainment of those targets, as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document.[2] Each Party also has to report on the progress made in the achievement of its target.

2. All Annex I Parties except Turkey have pledged targets as agreed in the Copenhagen Accord. Each target is stipulated as a percentage reduction in absolute emissions from a base year level to be achieved by 2020. Some Parties have taken on multiple targets: one that is unconditional (or independent of forthcoming circumstances) and others that are conditional (or contingent upon certain conditions, such as treaty provisions or pledges made by other Parties).

3. Examples of the provisions tied to the conditional targets are: achieving a comprehensive global agreement, with the participation of all major economies; all Parties contributing their fair share to a cost-effective global emission reduction pathway; and an effective set of rules for land use, land-use change and forestry (LULUCF) and the use of units from market-based mechanisms (MBMs). Table 1 shows Annex I Parties' targets, their base years, the conditionality status of their 2020 targets and their post-2020 targets. In essence, the 2020 targets reported in the second biennial reports (BR2s) remain the same as those reported in the document FCCC/SBSTA/2014/INF.6, with exception of Belarus[3] and Japan[4]. Table 12 in the annex presents additional details on the description of the targets.

4. All Parties have pledged post-2020 targets in their intended nationally determined contributions (INDCs) under the Paris Agreement, and some of them reported thereof in their BR2s. These include targets for 2030 for all Parties except for the United States of America, which has a target for 2025; for some Parties, these include long-term targets. In most cases, targets submitted with INDCs update the post-2020 targets under the Copenhagen Accord. For consistency, such post-2020 targets are shown for Parties that reported thereof in their BR2s and those that did not.[5]

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[1] Kazakhstan submitted a quantified economy-wide emission reduction target to the secretariat although it is a Party not included in Annex I to the Convention. Unless specified otherwise, information on Kazakhstan is not included in the compilation and synthesis of the BR2s presented in this document.

[2] The latest update is contained in document FCCC/SBSTA/2014/INF.6, available at <http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf>.

[3] Belarus communicated to the secretariat a conditional target of a 5–10 per cent emission reduction the compared with 1990 levels, which is reflected in the document FCCC/SBSTA/2014/INF.6; while it communicated a target of 8 per cent in its first and the second biennial reports.

[4] After publication of document FCCC/SBSTA/2014/INF.6, Japan formally resubmitted its 2020 emission reduction target as being "3.8 per cent or more emission reduction in 2020 compared to the 2005 level". The information is available at: <http://unfccc.int/focus/mitigation/items/9736.php>.

[5] Information on the post-2020 targets contained in the INDCs is available on the UNFCCC website, at <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>.

Table 1
**Annex I Parties' greenhouse gas emission reduction targets**

| *Party* | *Quantified economy-wide emission reduction targets for 2020 (reduction from base year emission level)*[a] | *GHG emission reduction targets for 2030 unless otherwise noted (reduction from base year emission level)*[b] | *GHG emission reduction long-term targets or objectives (reduction from base year emission level)* |
|---|---|---|---|
| Australia | 5% (unconditional); 15% (conditional); 25% (conditional) all relative to 2000 | 26–28% relative to 2005 | |
| Belarus | 5–10% (conditional) relative to 1990 | At least 28% relative to 1990 | |
| Canada | 17% (conditional) relative to 2005 | 30% relative to 2005 | |
| European Union and its 28 member States | 20% (unconditional); 30% (conditional) both relative to 1990 | At least 40% relative to 1990 | 80–95% relative to 1990 by 2050 |
| Iceland | 20% (unconditional); 30% (conditional) both relative to 1990[c] | 40% relative to 1990[c] | |
| Japan | At least 3.8% relative to 2005[d] | 25.4% relative to 2005 | |
| Kazakhstan | 15% (unconditional) relative to 1990 | 15% (unconditional); 25% (conditional) both relative to 1990 | 25% relative to 1990 by 2050 |
| Liechtenstein | 20% (unconditional) relative to 1990 | 40% relative to 1990 | |
| Monaco | 30% (unconditional) relative to 1990 | 50% relative to 1990 | Carbon neutral by 2050 |
| New Zealand | 5% (unconditional); 10–20% (conditional) both relative to 1990 | 30% relative to 2005 | 50% relative to 1990 by 2050 |
| Norway | 30% (unconditional); 40% (conditional) both relative to 1990 | At least 40% relative to 1990 | Carbon neutral (unconditional) by 2050 |
| Russian Federation | 15–25% (conditional) relative to 1990 | Limiting GHG emissions to 70–75% of the 1990 level (conditional to the maximum possible accounting of forest sink capacity) | |
| Switzerland | 20% (unconditional); 30% (conditional) both relative to 1990 | 50% relative to 1990 | |

| *Party* | *Quantified economy-wide emission reduction targets for 2020 (reduction from base year emission level)*[a] | *GHG emission reduction targets for 2030 unless otherwise noted (reduction from base year emission level)*[b] | *GHG emission reduction long-term targets or objectives (reduction from base year emission level)* |
|---|---|---|---|
| Turkey | No target | Up to 21% reduction from the 'business as usual' level | |
| Ukraine | 20% (conditional) relative to 1990 | Not exceeding 60% of 1990 emission level | |
| United States | In the range of 17% relative to 2005 | 26–28% relative to 2005 by 2025 | |

*Abbreviation*: GHG = greenhouse gas.

[a] As communicated to the secretariat and contained in document FCCC/SBSTA/2014/INF.6, unless otherwise specified.

[b] As reported in intended nationally determined contributions, available at <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>.

[c] To be fulfilled jointly with the European Union and its 28 member States.

[d] The target was modified after publication of document FCCC/SBSTA/2014/INF.6, as officially communicated to the secretariat by the Government of Japan.

5. The emission reduction targets (unconditional or unspecified) for 2020 range from at least 3.8 per cent below the 2005 emission level (Japan) to 30 per cent below the 1990 emission level (Monaco and Norway[6]). The conditional emission reduction targets for 2020 – taken on by Australia, Belarus, Canada, European Union (EU), Iceland, New Zealand, Norway, Russian Federation, Switzerland and Ukraine – range from 5-10 per cent below the 1990 emission level (Belarus) to 30 per cent below the 1990 emission level (EU, Iceland and Switzerland) and 40 per cent below that level (Norway). Australia and Canada selected 2000 and 2005 as base years for their conditional emission reduction targets, respectively. When a Party submitted two targets, unconditional and conditional, it aimed at increasing the ambition of its target under certain circumstances.

6. Under the Convention, the EU has taken on a target for 2020 jointly with all its 28 member States. Details on the implementation of this joint target, which is unique under the Convention, are provided in the 2008 EU climate and energy package. The package stipulates that the target will be met by the EU and its member States through a 21 per cent reduction, below the 2005 level, in greenhouse gas (GHG) emissions from installations under the EU Emissions Trading System (EU ETS) and a 10 per cent reduction, below the 2005 level, in GHG emissions from the sectors not covered by the EU ETS (non-ETS sectors) (primarily transport and some industrial processes and product use, agriculture and waste). For emissions covered by the EU ETS, the common EU-wide target applies to all member States as a group; for emissions outside the EU ETS, the EU effort-sharing decision (ESD) provides targets for each member State individually to reduce or limit growth in its GHG emissions between 2005 and 2020. Thus, at present, the EU member States do not have individual emission reduction targets for their total emissions under the Convention. Table 13 in the annex provides an overview of the targets for the non-ETS sectors, under the EU ESD, of the EU member States.

[6] Norway reported in its BR2 that its unconditional target under the Convention for 2020 of 30 per cent emission reduction relative to 1990 emission levels is consistent with the quantified emission limitation or reduction commitment of 84 per cent of the base year emissions for the period 2013–2020 as defined in the Doha Amendment to the Kyoto Protocol. Thus, compliance under the Kyoto Protocol should ensure that Norway meets also the emission reduction target by 2020 under the Convention.

7. For the post-2020 period, all Parties indicated in their INDCs targets for 2030, except for the United States, which indicated a target for 2025, and some Parties indicated in addition longer-term targets. Most Parties use 1990 as a base year, while Australia, Canada, Japan, New Zealand and United States use 2005. The 2030 targets range from 15 per cent (Kazakhstan) to 50 per cent (Monaco and Switzerland) below the 1990 level.

8. Some Parties (e.g. the EU, Kazakhstan, Monaco, New Zealand and Norway) have also established, as part of their Copenhagen Accord pledges, long-term targets or objectives for the post-2020 time-horizon, typically for 2050, and report thereof in their BRs.

## B. Use of units from market-based mechanisms and land use, land-use change and forestry activities, and other accounting aspects related to the targets

9. The commonly cited base year is the reference for measuring carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$) emissions towards meeting Parties' targets (see table 12 in the annex). For many Parties, the base year for fluorinated gases (F-gases) (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride ($SF_6$)) is the same as for the other gases ($CO_2$, $CH_4$ and $N_2O$), but for Kazakhstan and Monaco, they differ. With regard to gas coverage, all Parties include emissions of $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs and $SF_6$ in their targets; all but Belarus, EU, Iceland, Kazakhstan and Liechtenstein also include nitrogen trifluoride ($NF_3$) emissions in their targets, but Norway and Ukraine[7] have yet to determine their base year for that gas.

10. Parties use different global warming potential values to calculate their targets and the progress made towards meeting them. Most Parties use the values contained in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), but Belarus and Ukraine use those from the IPCC Second Assessment Report.

11. With regard to the sectoral coverage of the targets, all Parties include in their targets:

(a) Emissions from the energy, transport, industrial processes[8], agriculture and waste sectors; the EU target also includes emissions from aviation, which are included in the EU ETS;

(b) Emissions and removals from LULUCF, except for Belarus, EU, Kazakhstan, Monaco, the Russian Federation and Ukraine, but they vary in their accounting approaches; some use the activity-based approach to LULUCF accounting, and others use the land-based approach.

12. Parties vary in whether they account for the use of units from MBMs (i.e. acquired certified emission reductions (CERs), emission reduction units (ERUs), assigned amount units (AAUs), carry-over units under the Kyoto Protocol and units from other mechanisms under the Convention) in achieving their targets (see table 12 in the annex).

[7] For Ukraine, data were taken from its BR1 since at the time of preparation of this report it has not yet submitted its BR2.

[8] Industrial processes refer to the industrial processes and solvent and other product use sectors.

# II. Progress made in achieving the quantified economy-wide emission reduction targets and use of units from market-based mechanisms

## A. Overview

13. In their BR2s, Parties reported on the progress made in achieving their targets as reflected in their GHG emission trends and the use of units from MBMs and LULUCF activities, as well as on their mitigation actions and their effects.

14. This chapter discusses GHG emissions for all 43 Annex I Parties.[9] Information on emission data is taken from the 2016 annual GHG inventory submissions received as at 27 June 2016,[10] except for Monaco, which, at the time of preparation of this report, had not submitted its GHG inventory for 2016. Data for Monaco are based on information from the 2015 GHG inventory. Total aggregate GHG emissions, emissions by gas, emissions by sector and emission data for individual Annex I Parties are presented for three distinct periods: 1990–2014, 1990–2000 and 2000–2014. This chapter also presents trends in indicators related to GHG emissions to provide some context about the relative roles of drivers influencing the trends. It also presents the use of LULUCF activities and units from MBMs in meeting the targets, and ends with a summary of the progress made up to the latest reported year by Parties in meeting the targets.

15. Annex I Parties also reported information on mitigation actions and their effects in the context of progress made towards their targets. These are discussed separately in chapter III below.

## B. Greenhouse gas emission trends

16. From 1990 to 2014, total aggregate GHG emissions excluding emissions/removals from LULUCF for all Annex I Parties decreased by 11.3 per cent, from 20,130 to 17,855 Mt carbon dioxide equivalent ($CO_2$ eq). Total aggregate GHG emissions including LULUCF decreased by 15.7 per cent, from 19,164 to 16,149 Mt $CO_2$ eq. The levels and trends in total GHG emissions for the period 1990–2014 for all Annex I Parties taken together, for Parties with economies in transition (EIT Parties) and for Parties that do not have economies in transition (non-EIT Parties) are illustrated in figure 1.

17. Over the period 1990–2014, the GHG emissions of EIT Parties decreased by 37.2 per cent without LULUCF and by 47.0 per cent with LULUCF. Due to the deep economic decline, there was a large decrease in emissions of EIT Parties during the period 1990–2000 (by 40.9 per cent without LULUCF and by 49.0 per cent with LULUCF). With the economic recovery after 2000, the emissions of EIT Parties increased until 2008 but then

[9] "Annex I Parties" refers to the 43 Parties included in Annex I to the Convention. All Annex I Parties, except Ukraine, have submitted their second biennial report. Unless specified otherwise, information provided on Ukraine in this report refers to Ukraine's first biennial report. Reference to "Parties" in this report means Annex I Parties and Kazakhstan, which, in accordance with the request of the Conference of the Parties (COP) at its twelfth session (FCCC/CP/2006/5, paragraph 96) follows the reporting requirements, for Annex I Parties.

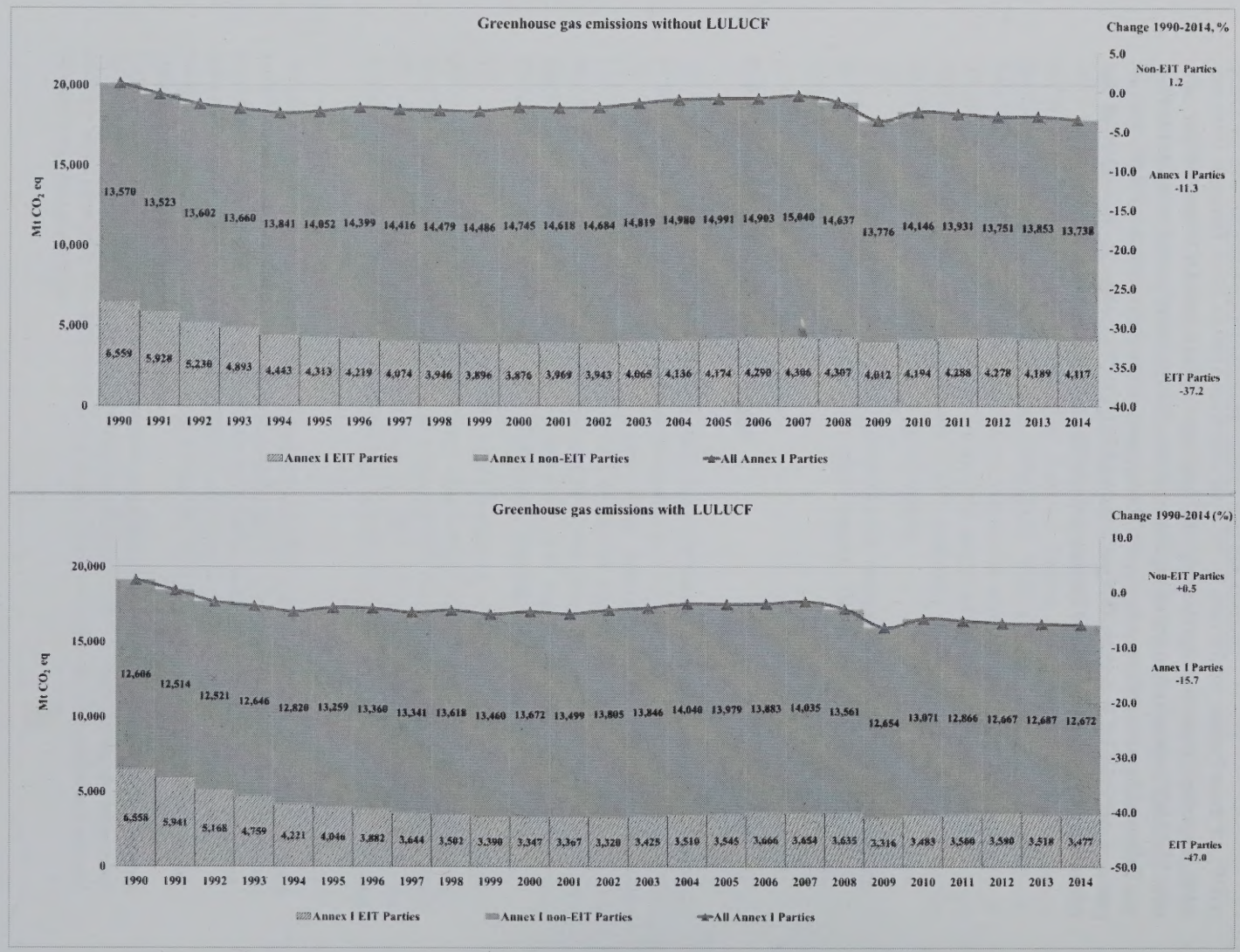
[10] Estonia and United States requested their common reporting format (CRF) tables not to be published on the UNFCCC website. However, for completeness purposes, data for these Parties are taken from the CRF tables submitted. The differences between the totals reported in the CRF tables and national inventory reports are minimal.

dropped in 2009 due to the global financial and economic crisis. In 2010 and 2011, emissions increased again, but have remained on a downward trend since 2012. Emissions between 2000 and 2014 rose by 6.2 per cent without LULUCF and by 3.9 per cent with LULUCF. This trend suggests that the structural changes in the economy, which resulted in major emission reductions in the 1990s, may no longer outweigh the impact of economic growth on GHG emissions in EIT Parties.

18. For non-EIT Parties, GHG emissions without LULUCF increased by 1.2 per cent, while GHG emissions with LULUCF increased by 0.5 per cent. The increase in emissions was much lower than the economic growth, measured in terms of gross domestic product (GDP), of these Parties, which rose by 59.5 per cent from 1990 to 2014. Between 1990 and 2000, emissions increased significantly (8.7 per cent without LULUCF and 8.5 per cent with LULUCF) compared to the change in emissions for the entire period 1990–2014. This was followed by a notable decrease in GHG emissions in the period 2000–2014 (by 6.8 per cent without LULUCF and by 7.3 per cent with LULUCF), reflecting the effect of the relevant policy packages of these Parties, and also the financial and economic crisis.

Figure 1

**Greenhouse gas emissions of Annex I Parties, 1990–2014**



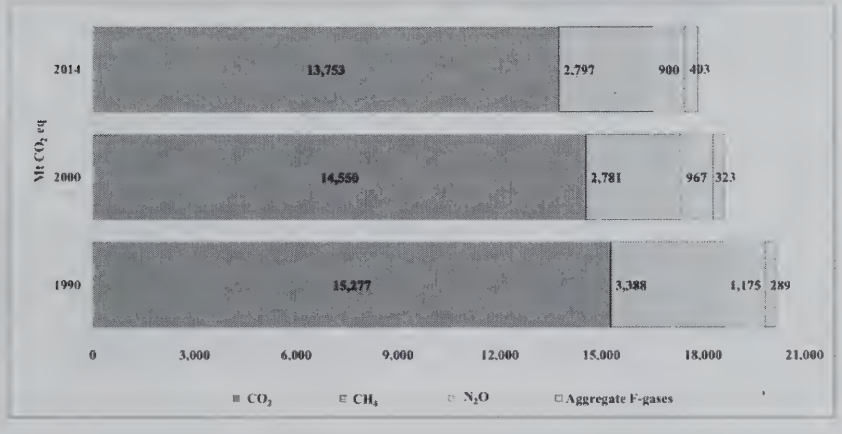

*Abbreviations*: EIT Parties = Parties with economies in transition, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

## C. Greenhouse gas emissions by gas

19. In all three time periods discussed in this report, emissions of $CO_2$, $CH_4$ and $N_2O$ decreased. The decline in emissions was largely attributed to fundamental drivers such as the economic decline in EIT Parties in the early 1990s; the stabilization of emissions in the subsequent period could be attributed, to a large extent, to the effects of the policies and measures (PaMs) promoting energy sources with low-carbon content such as natural gas, renewable energy and energy efficiency, as well as policies specifically addressing these gases, such as the EU ETS and broader environmental policies such as those regulating waste and landfills management. On the other hand, emissions of HFCs, PFCs, $SF_6$ and $NF_3$ taken together increased, owing mainly to increases in emissions of HFCs used as a substitute for ozone-depleting substances controlled by the Montreal Protocol. Figure 2 shows the changes in total emissions of each GHG in absolute terms.

Figure 2

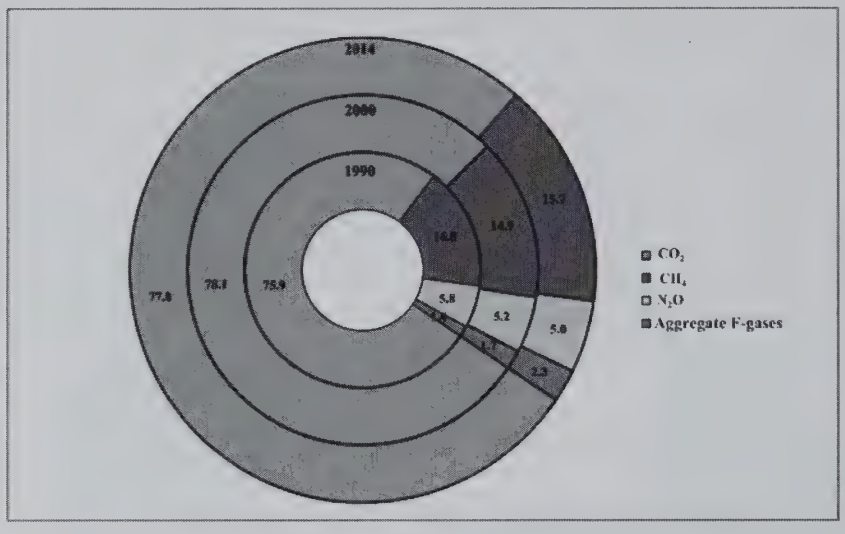
**Greenhouse gas emissions of Annex I Parties, by gas**




*Abbreviation*: F-gases = fluorinated gases.

20. Over the period 1990–2014, $CO_2$ continuously accounted for the largest share of total emissions, with 77.0 per cent in 2014. $CH_4$ and $N_2O$ contributed 15.7 per cent and 5.0 per cent, respectively, to total emissions in 2014. The sum of HFC, PFC, $SF_6$, unspecified mix of HFCs and PFCs, and $NF_3$ emissions accounted for approximately 1.8 per cent of the total emissions in this period. Figure 3 shows the percentage shares of the individual gases in the total emissions.

Figure 3
**Share of individual greenhouse gases in total emissions without land use, land-use change and forestry, 1990, 2000 and 2014 (per cent)**

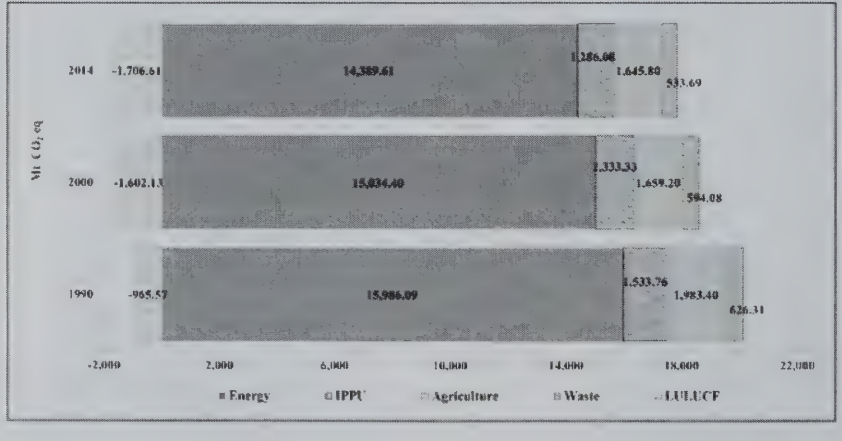



*Abbreviation*: F-gases = fluorinated gases.

## D. Greenhouse gas emissions by sector

21. Emissions from all sectors decreased between 1990 and 2014 (see figure 4). The greatest decrease occurred in agriculture (–17.0 per cent), which reflects the decline in $CH_4$ emissions from livestock. Emissions from industrial processes and product use underwent the second-largest decrease in the same period (–16.1 per cent), followed by waste (–14.8 per cent) and energy (–10.0 per cent). Net GHG removals from LULUCF increased by 76.7 per cent over the same period.

Figure 4
**Greenhouse gas emissions/removals of Annex I Parties, by sector**[a]



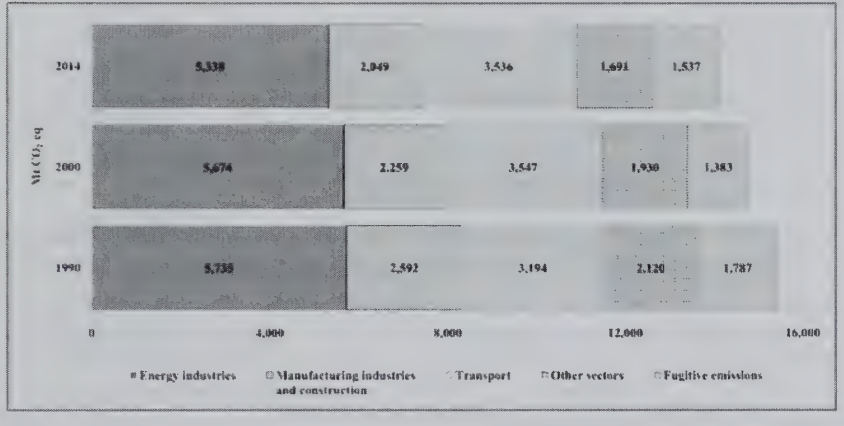

*Abbreviations*: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.

[a] Emissions from the sector other are not included in the figure because its contribution to total greenhouse gas emissions is very small. Emissions from this sector decreased by 27.2 per cent over the period 1990–2014 and by 15.5 per cent and 13.9 per cent in the periods 1990–2000 and 2000–2014, respectively.

22. Emissions from all subsectors of the energy sector, except transport, decreased by 10.7 per cent between 1990 and 2014 (see figure 5). A similar trend in emissions can be observed in the period from 1990 to 2000, where only emissions from transport increased (by 11.1 per cent). In the period from 2000 to 2014, however, fugitive emissions significantly increased (by 11.1 per cent), while emissions from all other activities within the energy sector, including transport, decreased. It is worth noting that emissions from transport continued to rise until 2007, but dropped by 3.3 per cent until 2009, then slightly rose in 2010 (by 0.98 per cent); since then, emissions have become relatively stable. In general, the emission trends were driven by a combination of economy-wide and sector-specific drivers including, but not limited to: structural changes in the Annex I Parties' economies (i.e. a shift from a manufacturing-based to a service-oriented economy that was particularly pronounced in EIT Parties); technological improvements in production processes and a shift to less carbon-intensive fuels (i.e. from coal to natural gas); an increased share of renewable energy sources (RES) in power generation (both electricity and heat); and an increased energy efficiency in all sector, in particular in the transport sector. One of the sector-specific drivers that led to an increase in emissions was increased activities related to oil and gas extraction and processing influencing fugitive emissions.

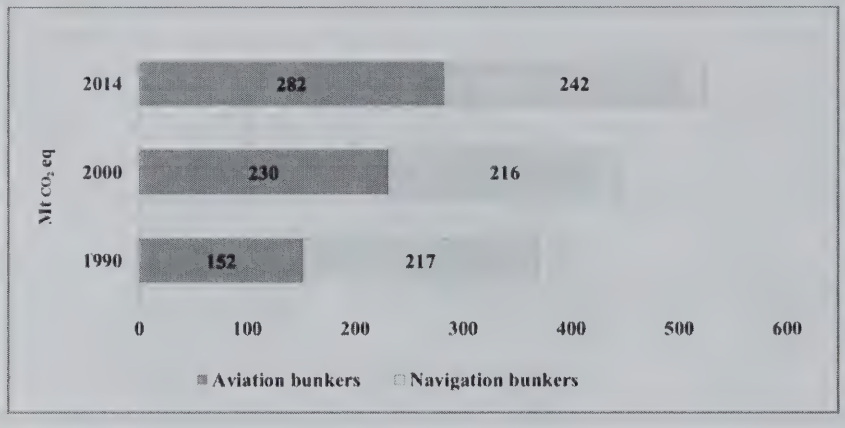
Figure 5

**Greenhouse gas emissions of Annex I Parties from the energy sector**




23. In 2014, emissions relating to fuel sold for use in international aviation and marine bunkers were much higher (by 85.9 per cent and by 11.4 per cent, respectively) than in 1990. Between 1990 and 2000, emissions from aviation increased, whereas emissions from navigation slightly decreased. During the period 2000–2014, emissions from international aviation and navigation bunkers increased by 22.4 per cent and 11.9 per cent, respectively (see figure 6).

Figure 6
**Greenhouse gas emissions of Annex I Parties from international bunkers[a]**




[a] Emissions from international aviation and navigation bunkers are not included in the national totals of Annex I Parties, but are reported separately.

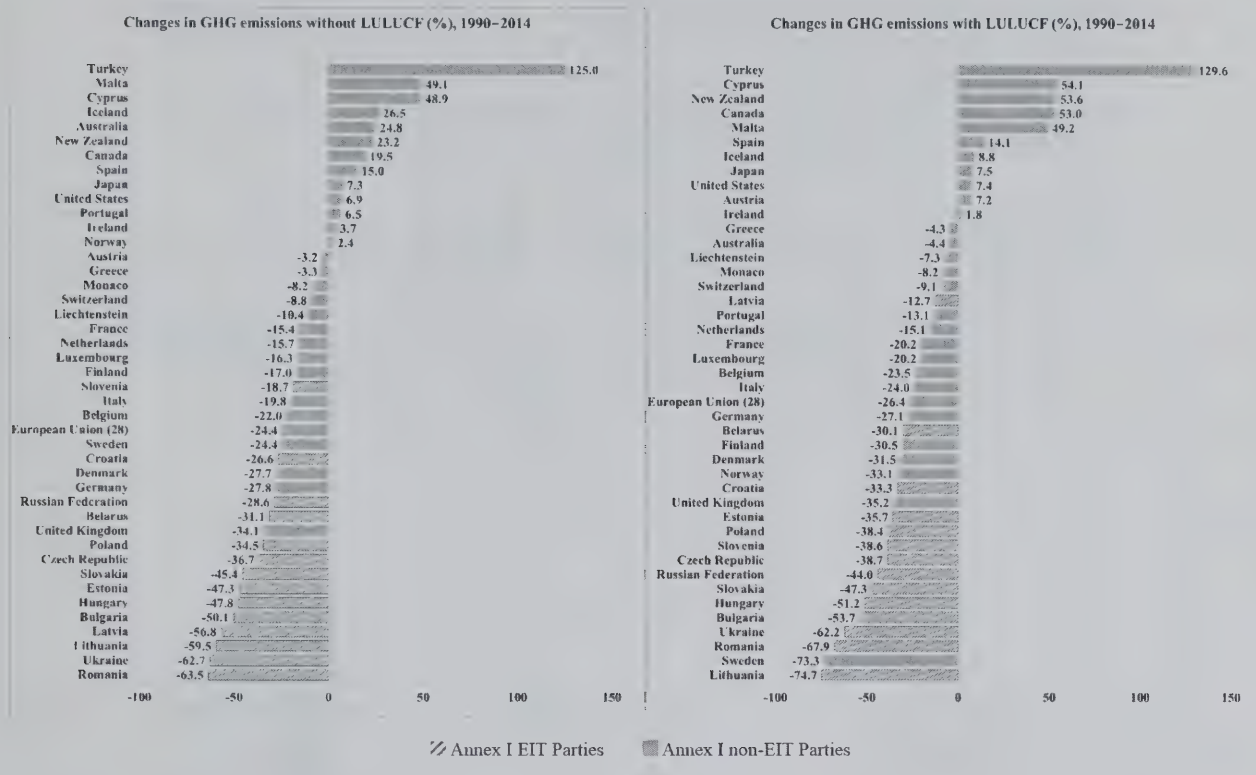
## E. Emission data for individual Annex I Parties

24. Total aggregate GHG emissions without and with emissions/removals from LULUCF for each Annex I Party are provided in tables 14 and 15 in the annex. Data are provided for 1990, 2000, 2010 and 2014. The percentage changes in emissions were calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the tables.

25. The changes in the total aggregate GHG emissions over the period 1990–2014 varied considerably across Parties (see figure 7). Romania experienced the largest decrease in emissions without LULUCF (−63.5 per cent), followed by Ukraine, Lithuania, Latvia and Bulgaria, with emission reductions of more than 50 per cent. On the other hand, Turkey experienced the greatest increase in emissions without LULUCF (125.0 per cent), followed by Malta and Cyprus, whose emissions increased by almost 50 per cent. For emissions with LULUCF, Lithuania experienced the largest decrease (−74.7 per cent) and Turkey the highest increase (129.6 per cent). Overall, emissions without LULUCF increased by more than 10 per cent in 8 Parties, and decreased by more than 10 per cent in all 14 EIT Parties and in 12 non-EIT Parties (Belgium, Denmark, EU, Finland, France, Germany, Italy, Liechtenstein, Luxembourg, Netherlands, Sweden and United Kingdom of Great Britain and Northern Ireland). Total aggregate GHG emissions with LULUCF over the period 1990–2014 increased in 11 Parties and decreased in 32 Parties.

26. In the period 1990–2000, emissions without LULUCF decreased in 23 Parties and increased in 20 Parties; emissions with LULUCF decreased in 25 Parties and increased in 18 Parties. From 2000 to 2014, total GHG emissions without LULUCF increased in 12 Parties and decreased in 31 Parties. Emissions with LULUCF increased in 13 Parties and decreased in 30 Parties.

Figure 7
**Changes in total aggregate emissions of individual Annex I Parties, 1990–2014**




*Abbreviations*: EIT Parties = Parties with economies in transition, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

## F. Development of greenhouse gas emission trends since 2012

27. In the last compilation and synthesis report,[11] GHG emissions were presented for the period 1990–2012, whereby a decreasing trend was noticeable. Moving forward, total aggregate GHG emissions of all Annex I Parties continued to decline, showing emission reductions of 1.0 per cent without LULUCF and 0.7 per cent with LULUCF between 2012 and 2014.

28. Following the trend since 2010, the year that economies started to recover after the crisis in 2008, emissions from the energy and waste sectors dropped over the period 2012–2014, whereas emissions from the industrial processes and agriculture sectors slightly increased (0.6 per cent and 0.1 per cent, respectively). Net GHG removals from LULUCF increased by 3.7 per cent.

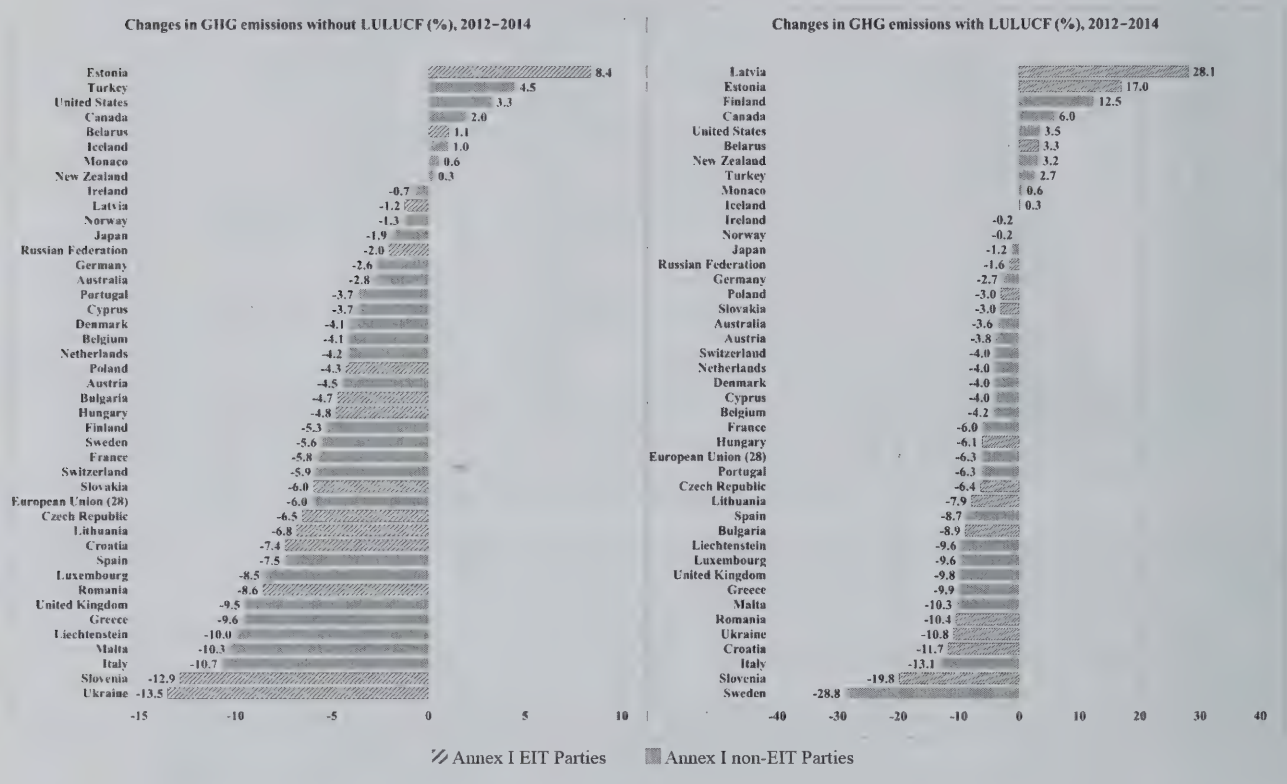
29. Figure 8 shows the changes in total aggregate GHG emissions from 2012 to 2014 for each Annex I Party. It depicts that an increase in emissions occurred in a lower number of Parties compared to the period 1990–2014, and that among these Parties, the number of non-EIT Parties diminished.

30. Between 2012 and 2014, Ukraine experienced the largest decrease in emissions without LULUCF (−13.5 per cent), followed by Slovenia, Italy and Malta, with emission

[11] FCCC/SBI/2014/INF.20/Add.1.

reductions of more than 10 per cent. Estonia had the largest increase (8.4 per cent) followed by Turkey. For emissions with LULUCF, Sweden experienced the largest decrease (−28.8 per cent) and Latvia the highest increase (28.1 per cent). Overall, emissions without LULUCF increased in 8 Parties (Belarus, Canada, Estonia, Iceland, Monaco, New Zealand, Turkey and United States), and decreased by more than 5 per cent in 19 Parties (8 EIT Parties and 11 non-EIT Parties). Total aggregate GHG emissions with LULUCF over the period 2012–2014 increased in 10 Parties and decreased in 33 Parties.

Figure 8
**Changes in total aggregate emissions of individual Annex I Parties, 2012–2014**




*Abbreviations*: EIT Parties = Parties with economies in transition, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

## G. Trends in indicators related to greenhouse gas emissions

31. Parties rely on two main policy levers to reduce their GHG emissions, which are to increase their use of RES and to improve the energy efficiency of their domestic economic activities.[12] In turn, the effects of mitigation actions that are included in the GHG emission trends are difficult to accurately estimate and separate using statistical methods from the effects of other key drivers, such as technological progress, that would take place anyway, and from price effects that are not the result of mitigation actions or economic recessions.

32. In some circumstances, the effects of mitigation actions can be concealed in increasing national total GHG emission trends when their effects are not the dominant

[12] Other levers include the use of nuclear energy and natural gas, and enhancing the sinks from forestry and carbon capture and storage in the longer term.

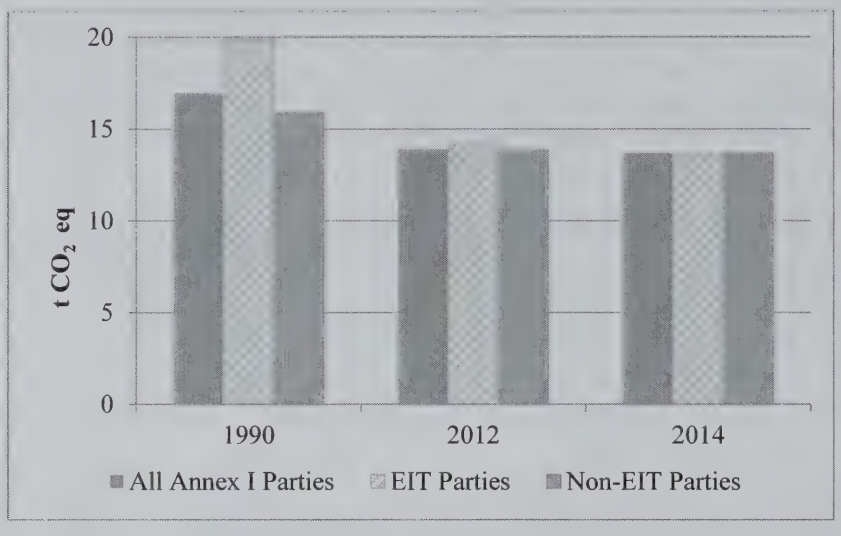
influence. For example, if over a few years, a country that principally relies on fossil fuels while in the process of decarbonizing its economy experiences a rapid economic or demographic expansion, the GDP or population may grow faster than the rate at which GHG emissions are being reduced by mitigation actions, and the net effect may be an increase in GHG emissions over the period. As a result, aggregate GHG emission trends may not be the most appropriate indicator of mitigation effort, and examining changes over time in indicators such as GHG emissions per capita and GHG emissions per unit of GDP offers an alternative for assessing progress in decarbonizing an economy.

33. Overall, the levels of GHG emissions per capita and GHG emissions per unit of GDP have continued their downward trend for most Parties; a few Parties have shown small increases. These indicators are generally higher for Parties that are endowed with natural resources and who rely on energy-intensive resource-based industries and the production and export of energy resources (e.g. Australia, Canada, Russian Federation and United States). Despite sharing similar national circumstances and being endowed with energy resources, Norway continues to stand out with its relatively low values for both indicators, owing, in part, to its hydro-based electricity production.

34. From 1990 to 2014, GHG emissions per capita of Annex I Parties[13] dropped by 19.4 per cent, from 16.96 to 13.67 t $CO_2$ eq, and the range among Parties narrowed in absolute terms from 3.85–33.71 t $CO_2$ eq in 1990 to 5.38–22.11 t $CO_2$ eq in 2014 (see figure 9). While GHG emissions per capita dropped by 31.5 per cent in EIT Parties (13.64 t $CO_2$ eq in 2014), a decrease of 13.7 per cent occurred in non-EIT Parties (13.68 t $CO_2$ eq in 2014), indicating that GHG emissions per capita of EIT Parties and non-EIT Parties have converged over the 1990–2014 period. Indeed, the gap in GHG emissions per capita that remained in 2012 has continued to narrow between 2012 and 2014 on the basis of further reductions of 3.5 per cent and 1.1 per cent for EIT Parties and non-EIT Parties, respectively. It is important to put these reductions in the context of demographic trends and highlight that while the total population of EIT Parties decreased by 5.8 per cent over the period 2012–2014, the total population of non-EIT Parties increased by 17.4 per cent, indicating that growth in population for these countries was not matched by a proportional increase in GHG emissions.

[13] Excluding Monaco, for which complete time series were not available.

Figure 9
**Greenhouse gas emissions per capita of Annex I Parties**

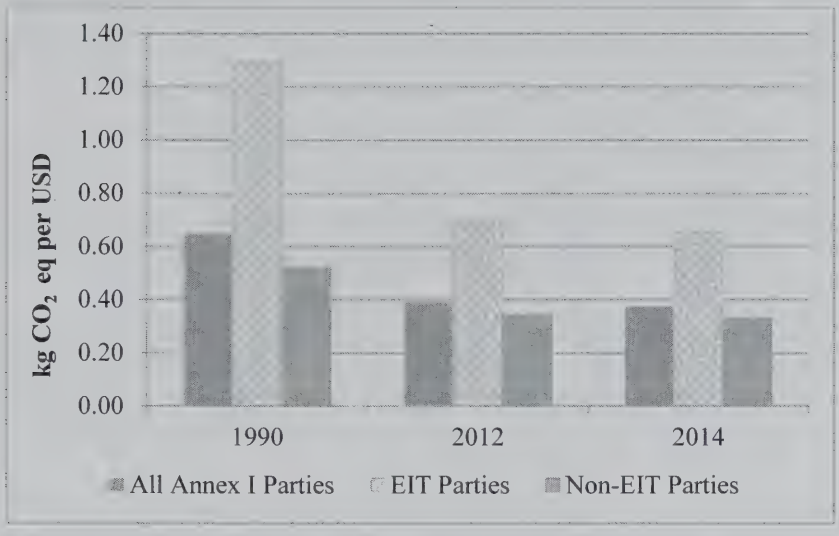



*Abbreviations*: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

35. Similarly, the level of GHG emissions per unit of GDP[14] of Annex I Parties dropped by 42.0 per cent between 1990 and 2014, from 0.65 to 0.37 kg $CO_2$ eq per USD, and the range of values narrowed from 0.17–1.87 kg $CO_2$ eq per USD in 1990 to 0.11–1.00 kg $CO_2$ eq per USD in 2014 (see figure 10). In this case, the gap in values that existed between EIT and non-EIT Parties in 1990 (1.30 and 0.52 kg $CO_2$ eq per USD, respectively) has been narrowed to 0.65 and 0.33 kg $CO_2$ eq per USD, respectively, in 2014. These reductions were realized on the backdrop of GDP growth values of 28.3 per cent and 59.5 per cent, respectively, for EIT and non-EIT Parties between 1990 and 2014. It is important to note that reductions in GHG emissions per unit of GDP continue to be substantial because between 2012 and 2014, EIT and non-EIT Parties achieved further decreases in GHG emissions per unit of GDP of 5.9 and 3.0 per cent, respectively, with two Parties exhibiting growth of around 4 per cent.

[14] Excluding Liechtenstein, Malta and Monaco, for which complete time series were not available.

Figure 10
**Greenhouse gas emissions per unit of gross domestic product of Annex I Parties**




*Abbreviations*: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

36. The continued decreases in values of GHG emissions per capita and per unit of GDP, including between 2012 and 2014, indicate that gains continued to be realized and that factors other than demographics and economic slowdown underpin reductions in emissions of Annex I Parties, and, in particular, the slight decrease in emissions of non-EIT Parties over the 2012–2014 period, during which population and GDP grew by 17.4 and 3.0 per cent, respectively. Overall, although it is difficult to accurately attribute GHG emission reductions to specific factors over time periods using statistical tools, since 1990, Parties have gradually intensified their efforts in implementing mitigation actions (see chapter III on mitigation actions), and continued improvements in both indicators appear to point towards them being contributing factors.

## H. Use of land use, land-use change and forestry activities and units from market-based mechanisms

37. Among Parties with targets, several do not include LULUCF in their targets, namely Belarus, EU, Kazakhstan, Monaco, the Russian Federation and Ukraine (see table 2 and table 12 in the annex). For the Annex I Parties that include LULUCF in their targets, in 2013, LULUCF activities contributed emissions reductions of 926 Mt $CO_2$ eq (see table 2).

38. All Parties with targets except Belarus, Kazakhstan, the Russian Federation and the United States reported that they intend to use units from MBMs. However, Norway and Liechtenstein were the only Parties reporting use of these units in 2012 and 2013, respectively (see table 2 below). Canada reported in its BR2 that it will consider the use of market-based mechanisms to achieve its target, but has not yet made a decision in that regard.

39. The EU and its member States have retained the option to use units from MBMs in achieving their targets under the Convention, including the EU ESD that allocates specific targets for the EU member States for sectors that are not covered by the EU ETS (see table 13 in the annex). However, no information was provided in the BR2s on the use of such units, because the data are not yet available. It is expected that more information on the use of units from MBMs will become available as Parties move closer to the year of the targets,

namely 2020. For the units from MBM used under the EU ETS, CERs and ERUs are no longer surrendered directly; rather they are exchanged into EU allowance units, which will become public for installations in 2016 (for 2013 transactions). Likewise for the ESD, the compliance assessment for 2013 and the potential use of units from MBM for that year will take place in 2016.

## I. Summary of progress made to date

40. Information on the progress reported in the BR2s and common tabular format (CTF) tables 1 and 4 or updated in the reports on the technical review of BR2s, as relevant, is summarized in table 2 below.

41. Taking into account emissions levels up to 2013 and reported contributions from LULUCF as well as units from MBMs, individual Parties have made progress toward their 2020 target to a various degrees. The emissions levels of Belarus (for 2012), Kazakhstan (for 2013), the Russian Federation (for 2013) and Ukraine (for 2012) were already lower than their respective 2020 targeted emission levels.

42. The emissions levels in 2013 combined with the contributions from LULUCF and/or units from MBMs, where applicable, of the EU, Japan, Liechtenstein and the United States indicated that these Parties had achieved most of the reductions needed to attain their 2020 reduction targets, however further efforts are still required to attain their 2020 targeted emissions levels. The EU achieved the highest emission reductions that brought it very close to 2020 targets levels. Australia, Canada, Monaco and Switzerland reported information that indicates that while progress has been made towards their target, the bulk of the reductions towards their 2020 target remained to be achieved.

43. New Zealand reported information indicating that in 2013 its emissions level combined with removals from LULUCF placed the Party at about 3.1 per cent above its base year emission level. The Party indicated that it expects to meet its target by using removals from LULUCF activities and surplus units from the first commitment period of the Kyoto Protocol. Iceland, although not an EU member State, has agreed with the EU to contribute to the joint 2020 target of the EU under the Convention. In 2013, Iceland's emissions level was 24.9 per cent above its 1990 level, but it indicated that it expects to use units from MBMs to meet the commitment of its contribution to the achievement of the joint EU target. Norway's emissions level in 2013 was 3.2 per cent above its 1990 level, but it is indicated by the Party, that units from MBMs will be used to balance GHG emissions in 2013 with the average annual emissions level for the period 2013–2020 (see explanatory footnotes to table 2 below).

44. For the base year, the United States reported a contribution from LULUCF removals, while Australia and Liechtenstein reported a contribution from LULUCF emissions. No Party reported the use of units from MBMs for the base year. For 2013, Japan, New Zealand, Switzerland and United States reported a contribution from LULUCF removals, while Australia and Liechtenstein reported a contribution of emissions from LULUCF. Contributions from LULUCF and units from MBMs used by Parties for that year are included in table 2.

Table 2
**Progress made by Annex I Parties in the achievement of their quantified economy-wide emission reduction targets, kt $CO_2$ eq[a]**

| | *Base year emissions* | *Targeted emission level in 2020* | *Emissions in 2013* | *LULUCF contribution in 2013* | *Use of units from MBMs in 2013* | *2013 emissions, with LULUCF and MBM contribution* |
|---|---|---|---|---|---|---|
| Australia | 560 790[b] | 532 751 | 541 924 | 7 522 | 0 | 549 446 |
| Belarus | 139 151 | 132 193 | 89 283[c] | NA(1) | NA(3) | 89 283[c] |
| Canada | 749 030 | 621 695 | 726 051 | NE | NE | 726 051 |
| EU (28) | 5 749 640 | 4 599 712 | 4 610 953 | NA(1) | NE | 4 610 953 |
| Iceland | 3 633 | Joint EU target | 4 536 | NE | NE | 4 536 |
| Japan | 1 396 511 | 1 343 444 | 1 407 775 | –60 564 | 0 | 1 347 211 |
| Kazakhstan | 387 215 | 329 133 | 313 442 | NA(1) | NA(3) | 313 442 |
| Liechtenstein | 234[b] | 187 | 237 | 12 | 52 | 197 |
| Monaco | 110 | 77 | 94[c] | NA(1) | 0[c] | 94[c] |
| New Zealand | 66 720 | 63 384 | 80 962 | –12 165 | 0 | 68 797 |
| Norway | 51 913 | 43 607[d] | 53 552 | NE | 19 133[c] | 43 607[e] |
| Russian Federation | 3 941 100 | 3 349 935 | 2 815 808 | NA(1) | NA(3) | 2 815 808 |
| Switzerland | 53 308 | 42 646 | 52 561 | –2 301 | 0 | 50 260 |
| Turkey | No target | | – | – | – | – |
| Ukraine[f] | 944 353 | 755 482 | 402 666[c] | NA(1) | NE[c] | 402 666[c] |
| United States | 6 438 281[b] | 5 343 773 | 6 649 701 | –858 477 | NA(3) | 5 791 224 |

*Note*: Values in the second column for targeted emission levels in 2020 were calculated by multiplying each Party's emissions in the base year by the percentage reduction of their 2020 target. Emissions in the base year are not fixed values and may change slightly with each new annual greenhouse gas emissions inventory submission.

*Abbreviations*: EU = European Union, LULUCF = land use, land-use change and forestry, MBM = market-based mechanism, NA(1) = not applicable because LULUCF is not included in the target, NA(2) = not applicable because LULUCF is not included in the base year emissions, NA(3) = not applicable because units from MBMs are not included in the target or because the Party reported it did not intend to use those units to meet its target, NE = not yet estimated by the Party.

[a] Data from the reports of the technical review of the second biennial reports, unless otherwise specified, available at <http://unfccc.int/national_reports/biennial_reports_and_iar/technical_reviews/items/9534.php>.

[b] Includes contributions from LULUCF of 63,799, 5 and –886,410 kt $CO_2$ eq for Australia, Liechtenstein and United States, respectively.

[c] Data for 2012.

[d] Targeted emission level in 2020 for Norway was calculated as an average annual emission level for the period 2013–2020 that equals to 84 per cent of the base year emissions. As mentioned in para 5 above, the unconditional target for Norway under the Convention for 2020 for 30 per cent emission reduction below 1990 emission levels is consistent with the quantified emission limitation or reduction commitment of 84 per cent of the base year emissions for the period 2013–2020 as defined in the Doha Amendment to the Kyoto Protocol.

[e] This number includes expected use of units from MBMs by Norway in 2013 (9,945 kt $CO_2$ eq) in order to balance actual GHG emissions in 2013 with the average annual emission level for the period 2013–2020.

[f] Reported in the Report of the technical review of the first biennial report of Ukraine, available at <http://unfccc.int/national_reports/biennial_reports_and_iar/technical_reviews/items/8446.php>.

# III. Mitigation actions

45. This chapter examines the climate change mitigation PaMs reported by Annex I Parties in their BR2s. Following the overview (section A), it shows the reported estimated impacts of the PaMs, in aggregate and by types of policy instruments and sectors affected (section B). It then highlights the major types of PaMs used to mitigate emissions, giving examples of the PaMs with the highest impacts aimed at cross-sectoral activities, energy-

related sectors and non-energy-related sectors (section C). The chapter then presents the main domestic institutional arrangements and measurement, reporting and verification (MRV) systems being used to support the PaMs and assess compliance with emission reduction commitments (section D). Finally, it synthesizes information on the assessment of the economic and social consequences of response measures (section E).

## A. Overview

46. In the submitted BR2s, Annex I Parties reported 1,706 PaMs, which was an increase of about 18 per cent from the 1,448 reported in the first biennial reports (BR1s) submitted two years earlier. Some 80 per cent of the PaMs have already been implemented, 10 per cent have been adopted and 10 per cent are planned. The PaMs are used at all levels of governmental jurisdiction: regional, national, state/provincial and municipal.

47. The overall portfolio of PaMs in the BR2s is very similar to that in the BR1s. Some new PaMs were added, but most of the changes pertain to the continued development, refinement and strengthening of already existing PaMs to align them with Parties' 2020 targets and prepare them for anticipated more-stringent targets beyond 2020. As such, most PaMs were presented in the context of the Parties' pledged targets agreed in the Copenhagen Accord. While some Parties also provided additional information in their BR2 about their INDCs, from the perspective of their longer-term targets, generally they did not discuss their PaMs in this light.[15]

48. The trend, emerging from the information reported in the BR1s, of Parties having broader policy coverage through a diverse portfolio of policies and policy instruments, is continuing. For example, there is increased use of framework targets, which usually have a broad coverage and also allow for project funding features to realize the mitigation potential in local situations.

49. Some Parties reported to have joined international cooperation and partnerships together with other Parties and non-state actors, to benefit from experience in designing and using certain PaMs and to use this input to help inform successful policy development. For example, the Carbon Pricing Leadership Coalition is a voluntary partnership of national and subnational governments, businesses and civil society organizations that agree to advance the carbon pricing agenda by working with each other towards the long-term objective of a carbon price applied throughout the global economy by strengthening carbon pricing policies and enhancing cooperation.

50. Some Parties are revising certain aspects of their PaMs in consideration of changing economics and operational sustainability. For example, Italy and Spain have reduced the incentives for renewable energy source-based electricity (RES-E) production, because their previous incentives were deemed too expensive given recent cost reductions in maturing RES-E technologies, and also because of new EU state aid guidelines, which apply to RES support schemes. Switzerland decided, in October 2015, to transition its energy strategy 2050 package from the current subsidy-based system to a mainly incentive-based system.

51. Some Parties are also using PaMs focused on project-based abatement opportunities. Canada uses its Low-Carbon Economy Trust Fund and Australia uses its Clean Energy Finance Corporation to fund projects that yield emission reductions and other benefits.

52. Of the new PaMs, two stand out, namely the Clean Power Plan (CPP) of the United States and the Australian Emissions Reduction Fund (ERF). The CPP sets out state-level emissions goals (i.e. fleet performance standards) for power plants. The ERF underpins the

[15] Several Parties also reported supporting developing countries in their preparation of INDCs.

purchase (through reverse auction) of emissions abatement, credited and certified in accordance with approved methods.

53. Regulatory and economic PaMs in the energy, industry/industrial processes and transport sectors continue to be the most frequently reported PaMs with the highest mitigation impacts.

54. Few Parties reported major changes occurring in their domestic institutional arrangements, but most provided brief descriptions of some facets of their institutions. Exceptions were Portugal and Ireland, which established new policy frameworks in 2015. Portugal overhauled its political and institutional response to climate change, establishing the Strategic Framework for Climate Policy. Ireland's Climate Action and Low Carbon Development Act provides a statutory basis to the institutional arrangements necessary to pursue and achieve the national objective of transition to a low-carbon, climate-resilient and environmentally sustainable economy by the year 2050.

55. Most Parties reported on some aspects of their MRV activities. This included MRV used to ensure that accounting systems for inventories, projections and the effects of mitigation actions are compatible. Some Parties reported on MRV in the context of compliance with devolved commitments or the functioning of certain PaMs. These include: MRV and accreditation within crediting or certification mechanisms; MRV of emissions by non-state actors; and MRV and the evaluation of the effectiveness of PaMs or compliance with devolved commitments by national governments.

## B. Mitigation actions and their effects

### 1. Total effects

56. Parties provided mitigation impact estimates for 742 PaMs, about 43 per cent of the total reported. These estimates provide a good starting point for discussing the trends and patterns among PaMs, but should be interpreted carefully in the light of the methodological difficulties described in box 1.

57. The estimated impacts totalled 4,058 Mt $CO_2$ eq in 2020. This compares to 3,765 Mt $CO_2$ eq for the same year in the BR1s.[16] Detailed information by Party on the number of mitigation actions reported, their implementation status and the estimated impacts can be found in tables 16 and 17 in the annex.

58. The PaMs vary considerably in their level of impact. Each of the PaMs with the 13 largest estimated impacts range from 100 to 750 Mt $CO_2$ eq avoided emissions, and, on aggregate, account for 56 per cent of the total impacts of all the PaMs. The 32 PaMs with the next-largest impacts, which range from 10 to 99 Mt $CO_2$ eq avoided emissions each, account for an additional 33 per cent of the total impacts. Of the PaMs with estimated impacts, some 90 per cent had individual impacts less than 10 Mt $CO_2$ eq avoided emissions in 2020.

[16] These values include the estimated impacts of the PaMs in all Annex I Parties, including EU member States, but excluding the EU. The values exclude the impacts of the EU ETS as reported by EU member States, but include the EU-wide impacts of the EU ETS, estimated for the purpose of this report to be 494 Mt $CO_2$ eq. The BR1 value (previously reported as 3,195 Mt $CO_2$ eq) reflects data revisions received after the publication of the BR1 compilation and synthesis (FCCC/SBI/2014/INF.20/Add.1). The total impacts of the BR1s and BR2s do not necessarily include the estimates of identical PaMs.

Box 1
**A caution about estimated mitigation impacts**

There are often methodological difficulties in estimating the mitigation impacts of individual policies and measures (PaMs) (as reported by Parties included in Annex I to the Convention) and also in assessing the roles of policy types and sectors affected among all PaMs (as presented in this compilation and synthesis).

For individual PaMs, Parties may have used differing assumptions about baselines or counterfactual conditions, free ridership, rebound effects and PaM interactions, as well as macroeconomic and energy market conditions; for example, Parties assigned mitigation impacts among their various interrelated PaMs (e.g. emissions trading systems and renewable energy measures) using various methodologies.

The European Union (EU) and most EU member States did not assign mitigation impacts to the EU Emissions Trading System (EU ETS), even though it is one of the central elements of the EU climate package. This is most likely due to the effects being assigned to other policies implemented in conjunction with the EU ETS framework.[a]

Of the 742 PaMs reported with mitigation impacts, 451 (accounting for 67 per cent of reported impacts, or 59 per cent of impacts of PaMs reported by the EU are excluded and EU ETS estimates are included) were classified with a single policy type and single sector. The remainder were classified as cross-cutting, directed at multiple emitting sectors and/or composed of multiple policy types.

[a] The EU did not report a mitigation impact for the EU ETS in its second biennial report. For the purpose of this document, the UNFCCC estimates the annual emission reduction impact of the EU ETS to be 494 Mt $CO_2$ eq below the 2005 level by 2020, and classifies it as an economic policy instrument. This value is the difference between the target 2020 emission caps (calculated on the basis of the 2013 cap with subsequent annual decreases) for fixed installations (1,816 Mt $CO_2$ eq) and aviation (210 Mt $CO_2$ eq), which are 21 and 5 per cent lower than the historical emission levels for fixed installations (2,299 Mt $CO_2$ eq) and aviation (221 Mt $CO_2$ eq), respectively, in 2005. This should be considered a low estimate of the impact of the EU ETS, because it does not account for the sector's baseline emissions in 2020 (i.e. those that would occur in the absence of the EU ETS). In comparison, the Ecofys study from 2009 (*EU Climate Policy Impact in 2020: With a Focus on the Effectiveness of Emissions Trading Policy in an Economic Recession Scenario*) estimates the difference between the EU ETS 2020 cap and the 2020 baseline to be 685 Mt $CO_2$ eq.

## 2. Policies and measures reported by policy types and sectors

59. In accordance with the "UNFCCC biennial reporting guidelines for developed country Parties" (hereinafter referred to as the UNFCCC reporting guidelines on BRs), as per decision 2/CP.17, Parties should classify their reported PaMs, to the extent possible, by type of policy instrument (economic, fiscal, voluntary agreement, regulatory, information, education, research and other) and by sector affected (energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other and cross-cutting). Figures 11 and 12 show the estimated impacts of the PaMs, according to these policy type and emitting sector classifications.

60. The categorization scheme yields an approximate view of the portfolio of PaMs, as some PaMs do not fit well within the scheme and many PaMs contain elements of multiple categories. In this report's assessment of PaM policy types and sectors, the mitigation impacts of multi-policy/multisector PaMs have not been subdivided among their various components. For the purpose of figures 11 and 12 and the corresponding figure 30 in the annex, the full impact of each PaM has been assigned to every one of its component policy

types and sectors, so there is some double counting included in the estimated aggregated mitigation impacts of the various types of policy instruments and sectors affected.

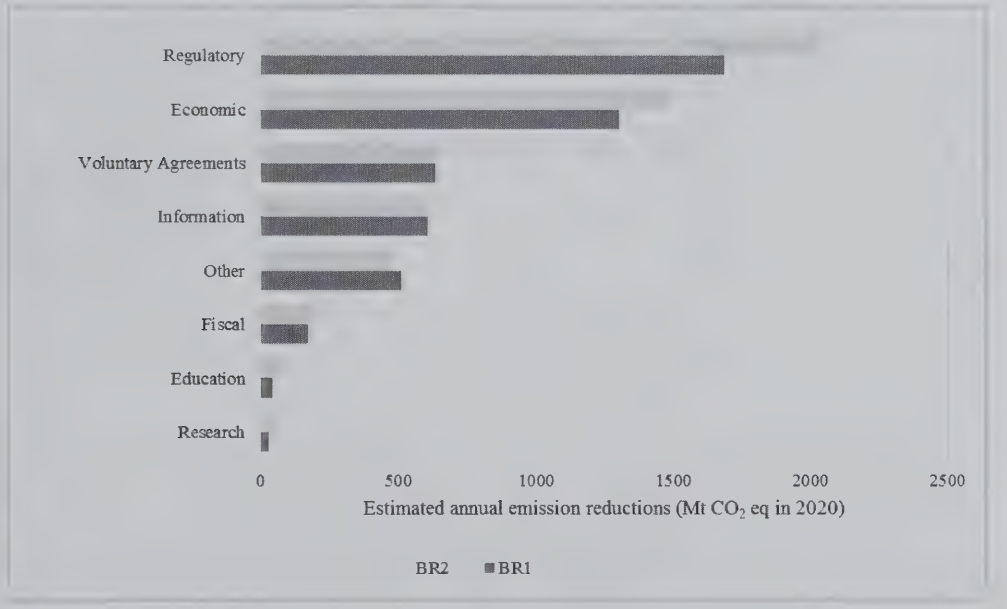
61. In addition, there are some issues with the definitions, guidance and reporting of PaM classifications that lead to data inconsistencies. For example, the EU ETS was listed 36 times in various forms by 21 Parties in the BR2s. The EU categorized the EU ETS as a regulatory PaM in the cross-cutting sector. In the other 35 instances, Parties categorized the overall EU ETS using six different combinations of the policy type classifications – regulatory, economic, fiscal and other – and 11 different combinations of the sector classifications – cross-cutting, energy, industry/industrial processes, transport, agriculture and other. As emissions trading systems (ETSs) attach value to carbon, they are generally considered as economic instruments and thus for the purpose of figure 12 and the corresponding figure 30 in the annex, the EU ETS has been consistently classified as an economic policy instrument.

62. The PaM policy types with the highest reported impacts are: regulatory (2,037 Mt $CO_2$ eq), followed by economic (1,483 Mt $CO_2$ eq), voluntary agreements, information and other (each in the 500–650 Mt $CO_2$ eq range), with each of the remaining categories having impacts less than 200 Mt $CO_2$ eq (see figure 11).

Figure 11

**Ranking of policies and measures, by type of policy instrument**

(Estimated annual emission reductions in Mt $CO_2$ eq in 2020)[a]




*Note*: These values include the estimated impacts of the policies and measures (PaMs) in all Annex I Parties, including European Union (EU) member States, but excluding the EU. However, the values exclude the impacts of the EU Emissions Trading System (EU ETS) as reported by EU member States, but include the EU-wide impacts of the EU ETS, estimated by the UNFCCC to be 494 Mt $CO_2$ eq, classified as an economic policy instrument. The BR2 values do not include the 2020 mitigation effect of the Clean Power Plan of the United States of America, which is reported as a regulatory PaM in the energy sector and becomes operational in 2022.

*Abbreviations*: BR1 = first biennial report, BR2 = second biennial report.

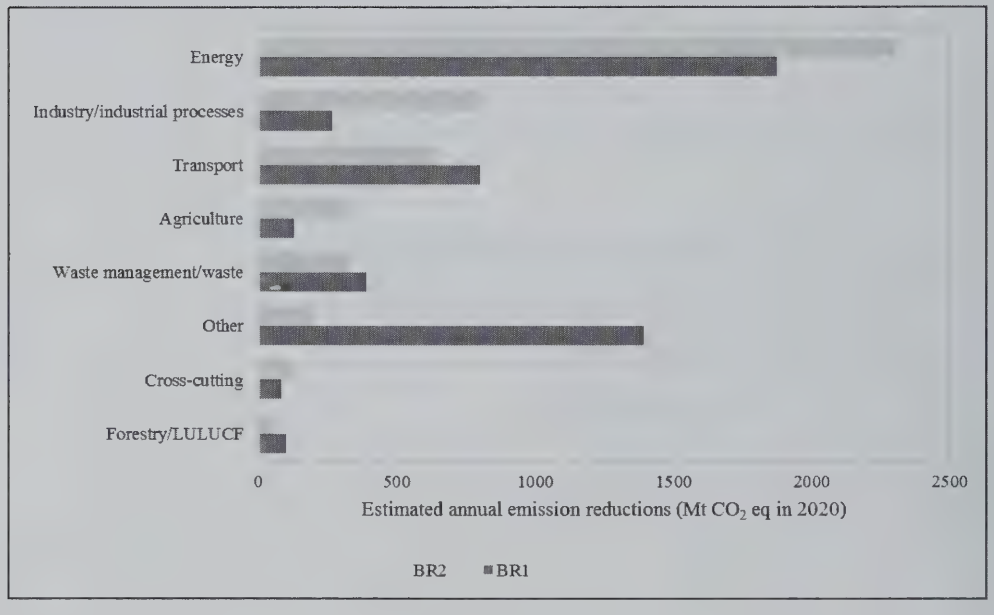
[a] For the reasons discussed in paragraph 60 above, this chart includes double counting of estimated emission reductions. The BR2 bars show 1,550 Mt $CO_2$ eq excess and the BR1 bars show 1,219 Mt $CO_2$ eq excess.

63. The affected sectors with the highest reported impacts are: energy (2,305 Mt $CO_2$ eq), followed by industry/industrial processes, transport, agriculture and waste management/waste (each in the 300–900 Mt $CO_2$ eq range), with each of the remaining categories having impacts less than 200 Mt $CO_2$ eq (see figure 12).

64. A full overview of the number of reported PaMs and the estimated emission reduction in 2020 by type of policy instrument and by sector affected discussed in this section appear in the corresponding figure 30 in the annex.

65. The ranking order of the policy types and sectors affected are similar for the BR2s as for the BR1s, except for the sector "other". This is primarily due to better, more precise, reporting categorization (i.e. less use of "other" as a catch-all category) of the PaMs in the BR2s compared to the BR1s, where many PaMs were classified as "other".

Figure 12
**Ranking of policies and measures, by sector affected**
(Estimated annual emission reductions in Mt $CO_2$ eq in 2020)[a]




*Note*: These values include the estimated impacts of the policies and measures (PaMs) in all Annex I Parties, including European Union (EU) member States, but excluding the EU. However, the values exclude the impacts of the EU Emissions Trading System (EU ETS) as reported by EU member States, but include the EU-wide impacts of the EU ETS, estimated by the UNFCCC to be 494 Mt $CO_2$ eq, allocated to the energy sector. The BR2 values do not include the 2020 mitigation effects of the Clean Power Plan of the United States of America, which is reported as a regulatory PaM in the energy sector and becomes operational in 2022.

*Abbreviations*: BR1 = first biennial report, BR2 = second biennial report, LULUCF = land use, land-use change and forestry.

[a] For the reasons discussed in paragraph 61 above, this chart includes some double counting of estimated emission reductions. The BR2 bars show 739 Mt $CO_2$ eq excess and the BR1 bars show 1,266 Mt $CO_2$ eq excess.

66. Some 977 PaMs (with reported impacts of 2,407 Mt $CO_2$ eq) were aimed at single emitting sectors using single policy types, while 653 PaMs (with reported impacts of 1,652

Mt $CO_2$ eq) were classified as cross-sectoral and/or multi-policy types. This general pattern resembles that of the PaMs in the BR1s.[17]

## C. Key mitigation actions

67. This section describes, sector by sector, the major PaMs targeting cross-sectoral emissions, energy-related emissions – from energy industries and their fugitive emissions; the residential, commercial and public sectors; transport; and manufacturing industries and construction – and non-energy-related emissions – from industrial processes and solvents, waste, agriculture and forestry/LULUCF.

68. Fuller descriptions of the principal types and characteristics of the PaMs discussed in this section appear in table 18 in the annex.

### 1. Cross-sectoral policies and measures

69. Some types of PaMs have emissions goals that are inherently cross-sectoral. Their incentives are undifferentiated among a wide range of emitting activities, usually in multiple sectors. The most common cross-sectoral PaMs are ETSs, carbon and energy taxes, framework targets, direct project funding programmes and basic research. Other types of PaMs, discussed in the energy and non-energy sector sections that follow, can also affect multiple sectors, but do not have undifferentiated incentives or goals among those sectors. For example, energy efficiency standards can be aimed at products (e.g. home appliances, office equipment, light bulbs, industrial motors and automobiles) in various energy end-use sectors, but their targets tend to be product specific, and, by extension, sector specific.

70. Cross-sectoral PaMs are high-profile "foundational" policies in the sense that they provide the underlying incentives, requirements and technical capacity for mitigation actions on a broad scale. They shape the fundamental economic, legal and policy environment in which numerous individuals and institutions make a multitude of emissions-relevant investments, purchases and behavioural changes. To the extent that cross-sectoral PaMs leave some sectors or emitting activities uncovered, or that they give inadequate incentives (e.g. price signals), resources and means for individuals and institutions to sufficiently reduce emissions, they can be supplemented with other types of PaMs.

Carbon pricing

71. Carbon pricing mechanisms seek to put a cost on fuel used or engaging in other GHG emitting activities. The intermediate goal is to put a uniform cost on each unit of $CO_2$ eq emitted; the wider the scope – in terms of geography, sectors, emitting activities and GHG gases – the lower the overall cost for a given amount of mitigation. The ultimate goal is to create incentives for individuals and institutions to reduce their emissions in the least expensive way possible. One group of countries and subnational jurisdictions promoting this approach to mitigation is described in box 2.

72. There is spectrum of PaMs that put a "price" on GHG emissions, and principally two cross-sectoral PaMs – ETSs and carbon taxes – mark the two limits of this spectrum. Carbon taxes are typically applied to fuels and electricity, seeking to raise their prices in a

[17] These values include the estimated impacts of the PaMs in all Annex I Parties, including EU member States, but excluding the EU. The values exclude the impacts of the EU ETS as reported by EU member States, but include the EU-wide impacts of the EU ETS.

manner consistent with their inherent emission factors. ETSs are used to create a price for carbon indirectly, by requiring emitters to submit a tradable certificate (or allowance) for each tonne of their $CO_2$ emissions, while limiting the quantity of available certificates via a quota or cap.

73. Since the early 2000s, the use of ETSs has grown more – in terms of occurrence and mitigation impact – than carbon taxes. Though less common, carbon taxes are still put forward as an alternative carbon pricing mechanism during policy deliberations, especially when the complexities and shortcomings (e.g. low price levels and price instability) of ETSs are discussed. In practice, carbon taxes are typically applied to a wider, more diverse range of sectors – including the transport, residential, commercial, public and less-energy-intensive industrial sectors – in addition to those commonly covered by ETSs – electricity generation and more energy-intensive industries. Examples include the taxes in Denmark, Norway, Sweden and United Kingdom. Carbon taxes are not yet applied to non-energy sources of GHG emissions.

74. ETSs and carbon taxes are sometimes seen as competing PaMs, but they can be used in a complementary manner. Some Parties (e.g. Norway and the United Kingdom) use carbon taxes and ETSs together, with the latter aimed at power generation and energy-intensive industry, and the former focused on the residential and commercial sectors.

Box 2
**Carbon Pricing Leadership Coalition**

Canada reported participation in the Carbon Pricing Leadership Coalition, which includes, among its national government partners: Belgium, Canada, Chile, Ethiopia, France, Finland, Germany, Italy, Kazakhstan, Mexico, Morocco, Netherlands, Norway, Spain, Sweden and Switzerland, and its provincial/state government partners: Alberta, British Columbia, California, Northwest Territories, Ontario and Québec.

The coalition is a voluntary partnership of national and subnational governments, businesses and civil society organizations that agree to advance the carbon pricing agenda by working with each other towards the long-term objective of a carbon price applied throughout the global economy by:

- Strengthening carbon pricing policies to redirect investment commensurate with the scale of the climate challenge;
- Bringing forward and strengthening the implementation of existing carbon pricing policies to better manage investment risks and opportunities;
- Enhancing cooperation to share information, expertise and lessons learned on developing and implementing carbon pricing through various "readiness" platforms.

75. ETSs continue to be the most widely used cross-sectoral instruments, owing to the certainty of their regulated emission levels and the flexibility that they allow for cost reduction. As of March 2016, there were 11 active ETSs in Annex I Parties and some of their subnational and regional jurisdictions, namely in Alberta, California, EU, Kazakhstan, New Zealand, Norway, Québec, Switzerland, Tokyo, United Kingdom and north-eastern United States. Out of the 44 Parties, 35 have either a national ETS or participate in a multinational ETS, and an additional three (Canada, Japan and United States) have subnational ETSs within their borders. While ETSs vary in scope, most are aimed at reducing $CO_2$ emissions from electricity and heat generation, industrial energy use, and transport fuel supply and demand. They tend to expand to cover additional sectors and gases as they mature.

76. In terms of recent development and since the BR1s were submitted, the EU ETS market stability reserve (MSR) has been adopted and a proposal for its phase 4 has been presented. The MSR will start operating in January 2019 to neutralize the negative impacts (i.e. low prices for allowances) of the existing surplus of allowances and improve the system's resilience to future shocks by adjusting the supply of allowances to be auctioned. Under the European Commission's legislative proposal for phase 4 of the EU ETS are: an increased annual reduction rate of the number of emission allowances of 2.2 per cent from 2021 onwards, compared to 1.74 per cent currently; reforms to the system to address carbon leakage; and the establishment of Innovation and Modernisation Funds.

77. Energy taxes (e.g. ad valorem and excise taxes) greatly influence energy use and GHG emissions, and are used by all Parties. While the primary purposes of energy taxes have historically been revenue generation and oil security, Parties are increasingly using their energy taxes to further their emission reduction goals by differentiating rates to favour RES (e.g. tax exemption for biofuels).

78. Carbon taxes, which, unlike energy taxes, are primarily aimed at environmental objectives, are used at the national level by 13 Parties, mostly in northern Europe. These taxes raise the prices of fuels and electricity in accordance with their inherent emission factors (e.g. $CO_2$ eq content). They have been a cornerstone of climate policies in Denmark, Finland, Netherlands, Norway and Sweden since the early 1990s. More recently, they have been introduced in Croatia, Germany, Iceland, Ireland, Liechtenstein, Slovenia, Switzerland and United Kingdom, and the Canadian province of British Columbia.

79. In practice, the distinction between energy and carbon taxes can be blurred. Both raise the price, and thus discourage the use, of fuels and electricity. Actual taxes can aim at both the revenue generation and oil security of energy taxes and the environmental objectives of carbon taxes. Since the BR1s were submitted, France has introduced a carbon component into domestic energy taxes on fossil fuel products. This component is proportional to the $CO_2$ content of the products concerned and increases with time, from EUR 7/t $CO_2$ in 2014 to EUR 100/t $CO_2$ in 2030.

Framework targets

80. Framework targets (or burden-sharing commitments) establish legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals for GHG emissions (carbon budgets), technology shares, fuel shares and efficiency, followed up by MRV procedures to ensure compliance. They are intermediate PaMs used by Parties to focus the direction and stringency of their operational PaMs or, in the context of multilevel governance, to devolve partial responsibilities for mitigation to lower levels of government (e.g. EU member States, states, provinces and municipalities).

81. Framework targets are increasingly specific – and often legally binding – in their overall emission reduction, renewable energy or energy efficiency mandates, but do not specify the mechanisms by which the targets should be accomplished. Lower levels of government must then implement their own operational PaMs (e.g. economic incentives and market instruments) to achieve the targets. The associated mitigation projects, sometimes funded by Parties from recycled revenues from ETS auctions and carbon taxes or other sources, are often administered by local authorities, which are closer to the actual concrete mitigation opportunities.

82. Framework targets are used mostly in the areas of electricity and heat generation, transport fuel supply and emissions from landfills. They are used most heavily by the EU, most notably in the EU climate and energy package of specific targets for 2020 (see box 3), but other Parties use them as well. They involve setting goals (e.g. to achieve a 20 per cent RES share of the final energy consumption and a 20 per cent reduction of primary energy

consumption by 2020), but leaving the development and implementation of specific measures to the EU member States. France, Ireland and United Kingdom have introduced carbon budgets that set legally binding limits on the total GHG emissions allowed in successive time periods. In Ireland and United Kingdom, the carbon budgets are further broken down into budgets for each government department. Other Parties devolve responsibility through funding mechanisms.

Box 3
**European Union Emissions Trading System and effort-sharing decision**

The European Union (EU) uses two cross-sectoral policies and measures – an Emissions Trading System (ETS) and a framework target – as the foundation of its climate change mitigation policy through to 2020. Together, they cover all emitting activities in the EU, except for domestic and international aviation, international maritime, and land use, land-use change and forestry, with a joint target of a 14 per cent reduction below the 2005 level by 2020, which is in accordance with a 20 per cent reduction below the 1990 level.

The EU ETS applies to power plants, energy-intensive industries and inter-EU aviation. It sets an EU-wide descending emissions cap – in accordance with a 21 per cent reduction target below the 2005 level by 2020 – to be achieved by the EU as a whole.

The effort-sharing decision (ESD) is a framework target that covers emissions from most sources outside the EU ETS. The ESD sector thus includes a diverse range of small-scale emitters in a wide range of sectors: transport (cars and trucks), buildings (in particular, heating), services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated gases from appliances and other sources, agriculture and waste.

The EU ESD sets legally binding quantified annual emission reduction targets for the ESD sector for each member State for the period 2013–2020. ESD targets are to be achieved individually by each member State each year. They are in accordance with an EU-wide ESD sector target of a 10 per cent reduction below the 2005 level by 2020 and national ESD targets ranging from –20 to +20 per cent reductions in the same period.

Direct project funding and urban and regional development

83. Direct project funding has grown recently, owing to the greater responsibility for mitigation actions given to lower-level governments (via framework targets), to increases in funding (from ETS revenues, the green investment scheme and other sources), and, in some cases, to changes in governments and/or political constraints on the use of regulations, ETSs and carbon taxes. Direct project funding involves national or regional governments providing financial support for projects administered by private enterprises or lower-level government authorities, which are better able to identify and execute niche – or site-specific – mitigation opportunities. This type of PaM has been reported by Australia (see box 4) and the EU. Australia also uses its Clean Energy Finance Corporation and Canada uses its Low-Carbon Economy Trust Fund to fund projects that yield emission reductions and other benefits.

84. Urban and regional development seeks to gain efficiencies and emission reductions through tighter integration among the components of large systems and networks. Japan has measures in place to make urban design, transport networks, power networks and industrial parks more climate-friendly.

Box 4
**Australia's Emissions Reduction Fund**

The Emissions Reduction Fund (ERF) is the centrepiece of Australia's approach to reducing emissions, and is funded at 2.55 billion Australian dollars. ERF methods include a range of abatement opportunities in the energy, transport, land, waste, agriculture and industrial sectors. A number of new methods are also under development. The ERF covers approximately 50 per cent of Australian emissions, applying to around 140 businesses in the electricity generation, mining, oil and gas, manufacturing, waste and transport sectors.

In the ERF, Australia's Clean Energy Regulator purchases (through reverse auction) greenhouse gas emission reductions credited and certified in accordance with approved methods. The ERF builds on the former Carbon Farming Initiative, expanding coverage to incentivize abatement across the Australian economy. It has three parts: crediting, purchasing and safeguarding. The Clean Energy Regulator credits abatement that has been certified in accordance with approved methods. Abatement from approved projects can then be purchased by the Clean Energy Regulator through reverse auctions. Finally, a safeguard mechanism is implemented to ensure that the abatement bought by the Government is not significantly offset by increases in emissions elsewhere in the economy.

Cross-cutting regulation

85. The policy links between mitigating climate change and air pollution are becoming increasingly clear in both developing and developed countries. In the EU, a revised national emissions ceiling directive has been proposed, as part of the Clean Air Policy Package, to replace the existing directive from 2001 (directive 2001/81/EC). Its overarching aim is to reduce the adverse health impacts of air pollution, including reducing the cases of premature deaths per year due to air pollution by more than half. In this regard, the proposal includes national emission reduction commitments for each member State for 2030 (with interim targets also set for 2025) for six specific pollutants: nitrogen oxides, sulphur dioxide, non-methane volatile organic compounds, ammonia, fine particulate matter and $CH_4$.

Research and development

86. Research and development (R&D) efforts are intended to improve the technical capacity to reduce emissions and also to improve the competitive position of Parties in the potential markets for new technologies. Many Parties reported their own R&D activities, most notably Japan (see box 5 for an example) and the United States; many others reported contributions to joint international research efforts. All emission reduction technologies can benefit from additional R&D, but the ones offering the largest potential emission reductions and facing the biggest technological challenges are: $CO_2$ capture and storage, hydrogen networks, fuel cells, cellulosic biofuels and solar power options. Owing to the long-term nature of R&D efforts, Parties are rarely able to estimate the specific effects of these efforts on emissions.

Box 5
**Japan's promotion of the development and diffusion of energy-efficient next-generation vehicles**

Japan aims to increase the share of next-generation vehicles that are highly energy efficient (including hybrid vehicles, electric vehicles (EVs), plug-in hybrid vehicles, fuel-cell vehicles, clean diesel vehicles and compressed natural gas vehicles) in its new car sales from 50 per cent to 70 per cent by 2030, by promoting measures to create initial demand, support research and development (R&D) to improve performance and build efficient infrastructure.

Specifically, in addition to promoting the development of recharging infrastructure, the Japanese Government will support the purchase of EVs to create mass-production effects and to promote price reduction and also support R&D to extend a cruising range and reduce cost.

In December 2014, fuel-cell vehicles entered the market, and the Japanese Government intends to systematically put in place hydrogen stations and utilize hydrogen from renewable energy sources with a view to diffusing fuel-cell vehicles. In addition, the Government will promote the diffusion and development of fuel-cell buses and other fuel-cell vehicles, and reform regulations on the basis of the Regulatory Reform Action Plan. In order to promote such diffusion of next-generation automobiles, the Government will work to provide preferential tax treatment such as tax cuts for eco-friendly automobiles.

## 2. Policies and measures in the energy sector

87. Emissions from the energy sector – fuel combustion activities and fugitive emissions from fuels – accounting for 81 per cent of the total GHG emissions without LULUCF in Annex I Parties in 2014 (see figure 5 above).

Energy supply

88. The largest share (33 per cent of total GHG emissions) in this sector's emissions come from energy industries. Among the PaMs categorized as energy (including energy industries, fugitive emissions, and the residential, commercial and public sectors) in the BR2s, the highest estimated impact comes from economic measures, followed by regulatory measures and voluntary agreements (see figure 30 in the annex). Examples of these three types of policies are provided in table 3.[18]

Table 3
**Examples of key policies and measures in energy supply**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| European Union, Directive 2009/28/EC on the promotion of the use of energy from renewable sources | 750 | Regulatory |
| Kazakhstan, Use of biogas plants in agriculture ($CO_2$ & $CH_4$) | 212 | Other (private investments) |
| Germany, Renewable energy act | 142 | Economic, regulatory |

[18] Examples of regulatory measures, voluntary agreements and economic measures categorized as energy sector PaMs, but aimed at the residential, commercial and public sectors are given in paragraph 106 below.

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| Russian Federation, State programme for development of coal mining industry (2014) | 84–168 | Economic |
| United States, Clean energy supply programs | 73 | Voluntary agreement, other (negotiated agreement) |
| Canada, Ontario coal phase out | 30 | Regulatory |
| United Kingdom, New energy supply policies | 25 | Economic, regulatory |
| Australia, Renewable energy target | 18 | Economic, regulatory |

89. Most Parties rely on two major policy levers to reduce GHG emissions in the energy supply sector: increasing the use of RES and additional decarbonization of the power sector via either regulations or ETSs.

90. RES-E is a prominent part of the efforts of many Annex I Parties to reduce emissions from electricity and heat generation. This is done through framework targets (EU and Russian Federation), usually with economic and regulatory measures. Green certificates are used in Australia and tariff premiums are used in Ukraine. Most EU member States reported meeting their RES-E targets through feed-in tariffs (fiscal incentives), while others, such as Poland, Romania and Sweden, use green certificates (other market instruments), and still others, such as Belgium, Italy and United Kingdom, use both feed-in tariffs and green certificates. Furthermore, some EU member States use additional investment grants, tax exemptions and fiscal incentives to promote RES-E generation.

91. The success of these PaMs, based on targets and economic incentives, is reflected in the rapid growth in renewable energy production and use in recent years. This growth has contributed to emission reductions, and many Annex I Parties are working towards still higher renewable energy targets in the 2020 time frame.

92. RES-E technologies have matured considerably in recent years, with a commensurate reduction in costs. Further increases in RES-E may thus require less incentives than in the past. In the BR2s, some Parties report efforts to improve their overall cost efficiency (decrease the budgetary burden) of the incentives, while continuing to encourage further development of RES-E. For example, in Italy, the incentives for RES-E (excluding photovoltaics) were changed in 2012. For new plants starting from 1 January 2013, the "green certificates" and the "all inclusive" tariff were replaced by a new, less-expensive scheme. The incentives are now divided into three parts depending on the type and power of plants: direct access to incentives (small plants), register enrolment (medium-sized plants) and auctions (larger plants).

93. Regulations are the principal type of PaMs aimed at reducing GHG emissions from power plants, and those with the highest impact are implemented in the United States and Canada. In the United States, the Environmental Protection Agency finalized the CPP rules in August 2015. The regulation sets out state-level emissions goals (i.e. fleet performance standards) for power plants (see box 6).

94. In 2012, the Government of Canada published the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, which came into effect in July 2015. The regulations apply an emission intensity limit (performance standard) on new coal-fired electricity generation units and on old units that have reached the end of their useful life. These regulations effectively ban the construction of new traditional coal-fired generation plants, as well as providing an accelerated phase-out schedule for existing plants and establishing high-efficiency gas as the standard for new plants. The province of Ontario

has phased out coal-fired electricity generation, and its electricity sector has been coal free since April 2014.

Box 6
**Clean Power Plan of the United States of America**

The United States of America, after legislation creating a national emissions trading system failed to pass through the Congress, moved to regulate emissions from power plants under the authority of the Clean Air Act (CAA), enacted in 1963 and revised several times thereafter. Therefore, the CAA became the foundation for introducing a significant body of greenhouse gas emission regulations that shifted the climate policy from relying mostly on voluntary approaches towards regulations with a higher degree of predictability of emission reduction outcomes.

The principal CAA climate change regulation is the Clean Power Plan (CPP), which was finalized in August 2015. The CPP sets out state-level emissions goals (i.e. fleet performance standards) for power plants. Individual states are responsible for developing and implementing tailored plans to ensure that their power plants collectively meet these standards. As part of the CPP, states will have needed to submit implementation plans by September 2016 or an initial submittal with a request for an extension of up to two additional years for plan development. The interim targets apply beginning in 2022 (allowing states to meet the interim goals over an eight-year averaging period), and the final goals must be met by 2030. The goal is to reduce carbon dioxide emissions by 32 per cent below the 2005 level by 2030 – an annual reduction of 790 Mt of carbon dioxide equivalent.

95. Other PaMs to tackle GHG emissions from electricity generation include: regulations and economic incentives to increase the use of natural gas in electricity generation (Australia (Queensland), Greece, Japan and Portugal); blue certificate programmes to promote electricity production from combined heat and power (Netherlands, Poland and the Flemish Region of Belgium); and regulations to promote the construction of nuclear power plants (Finland) or to ensure power transmission capacity (Japan). Other Parties have decided to re-examine the viability of their use of nuclear power in the light of the Fukushima Daiichi nuclear power plant accident and, in some cases, have even decided to phase it out (e.g. Germany and Switzerland).

Energy consumption

96. Energy end-use sectors, after the energy industries and fugitive emissions, are the remaining sources of emissions in the energy sector. Transport energy use (20 per cent of the total GHG emissions) is the largest emitter among the end-use sectors. It is followed by manufacturing industries and construction energy use (11 per cent) and residential, commercial and public sector energy use (9 per cent) (see figure 5 above).

97. Annex I Parties also implemented mitigation PaMs in all of the major energy end-use sectors: transport, industry, and residential, commercial and public. Most of the PaMs focus on improving energy efficiency (as opposed to fuel switching). Although Parties continue to promote mitigation through PaMs traditionally associated with energy efficiency goals, they are increasingly drawing attention to the emission reduction aspects of those PaMs through standards and labelling.

98. While most PaMs related to energy consumption are sector specific or even more narrowly targeted, the EU has implemented a multisector, multi-PaM policy package aimed at energy efficiency. The EU energy efficiency directive, first reported in its sixth national communication (NC6), is a package comprising framework targets, market reforms,

regulations, public facilities management, and information and awareness, aimed at improving energy efficiency in all sectors in order to achieve the EU target of a 20 per cent reduction of primary energy consumption by 2020.

Transport

99. Among the PaMs categorized as transport in the BR2s, the highest estimated impact comes from regulatory measures. Examples of some of the largest regulatory measures aimed at the transport sector are provided in table 4.

Table 4
**Examples of key policies and measures in transport**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| United States, National program for light-duty vehicle GHG emissions and CAFE standards | 236 | Regulatory |
| United States, Renewable fuel standard for vehicles, mandating the deployment and use of renewable fuels, including biomass-based diesel and other advanced biofuels | 138 | Regulatory |
| European Union, Directive 2009/30/EC on the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions | 55 | Regulatory |
| Germany, Mandatory biofuel quotas | 13 | Regulatory |
| Canada, Light-duty vehicle GHG regulations: phase 1 and 2 | 13 | Regulatory |
| Italy, Emission standard for new car (Regulation (EC) No 443/2009) | 10 | Regulatory |
| United Kingdom, Car fuel efficiency policies | 6 | Regulatory, information, voluntary agreement |

*Abbreviations*: CAFE = Corporate Average Fuel Economy, EC = European Commission, GHG = greenhouse gas.

100. Transport PaMs typically seek to either reduce fuel demand through modal shift or efficiency standards, or reduce the carbon intensity of the fuel supply through blending of fuels or use of electric vehicles.

101. To reduce transport fuel demand, Annex I Parties continued to use regulations, voluntary sectoral commitments, ETSs, fiscal incentives, information programmes and long-term R&D in order to increase the efficiency and effectiveness of transport services and to promote non-motorized modes of transport. Road vehicle fuel economy and $CO_2$ emission standards, implemented increasingly via mandatory regulations (replacing voluntary approaches), have the highest mitigation impact of all transport-related measures.

102. To reduce the carbon intensity of transport fuel supply, Annex I Parties reported on the continued use of framework targets (delivered through economic incentives and other market instruments), regulations, other market instruments and long-term R&D to increase the use of liquid RES fuels (biofuels), but, in the long term, also through the use of electricity, fuel cells and hydrogen.

Industry

103. Among the PaMs categorized as industry/industrial processes in the BR2s, the highest estimated impact comes from regulatory measures, followed closely by information, with lesser impacts from economic measures and voluntary agreements.

Examples of some of the largest regulatory measures, information, economic measures and voluntary agreements aimed at industrial energy use are provided in table 5.[19]

Table 5
**Examples of key policies and measures in industry**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| Germany, Electricity savings | 47 | Regulatory, information, fiscal, economic |
| France, Energy efficiency certificates | 19 | Economic |
| Canada, Alberta specified gas emitters regulation | 10 | Economic |
| Finland, Energy efficiency agreements 2008–2016 and the expected extension until 2035 | 9 | Voluntary agreement |
| United Kingdom, Renewable heat incentive (planned funding) | 7 | Economic |
| Belgium, Long-term energy/$CO_2$ efficiency agreements in the industrial sector | 3 | Voluntary agreement |
| Italy, White certificates, decree December 2007 – Industry | 2 | Economic |
| Lithuania, Increasing the energy efficiency | 1 | Voluntary agreement, regulatory, economic, information |

104. Regarding the industry sector, Parties aim to: increase energy efficiency and general emission reductions (i.e. not targeting specific equipment and processes) in energy-intensive industries; increase the implementation of energy-efficient methods (e.g. energy management systems); increase the use of energy-efficient equipment (e.g. motors, boilers and lighting), particularly, but not exclusively, in small- and medium-sized enterprises; and promote long-term R&D of $CO_2$ capture and storage by energy-intensive industries. To achieve these aims, they continued to use ETSs, regulations, voluntary sectoral commitments (Japan), voluntary enterprise partnerships (EU), information and long-term R&D.

Residential, commercial and public sectors

105. Among the PaMs categorized as energy (which includes the residential, commercial and public sectors) in the BR2s, the highest estimated impact comes from regulatory measures, followed by voluntary agreements and economic measures. Examples of some of the largest regulatory measures, voluntary agreements and economic measures aimed at the residential, commercial and public sectors are provided in table 6.

[19] Examples of regulatory measures, information, economic measures and voluntary agreements categorized as industry/industrial processes PaMs, but aimed at the non-energy aspects of industrial processes are given in paragraph 109 below.

Table 6
**Examples of key policies and measures in residential, commercial and public sectors**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| United States, Appliance, equipment, and lighting energy efficiency standards | 216 | Regulatory |
| European Union, New integrated covenant of mayors for climate and energy | 190 | Voluntary agreement |
| European Union, Directive 2010/31/EU on the energy performance of buildings | 185 | Regulatory |
| United States, ENERGY STAR labeled products | 141 | Voluntary agreement |
| United States, Home performance with ENERGY STAR | 56 | Economic |
| Germany, Electricity savings | 47 | Regulatory, information, fiscal, economic |
| France, energy efficiency certificates | 19 | Economic |
| European Union, Voluntary eco-design scheme for imaging equipment | 10 | Voluntary agreement |

106. Regarding the residential, commercial and public sectors, Annex I Parties reported the continued use of regulations (Australia, EU and Japan), fiscal incentives (Australia, Ireland, Portugal, Switzerland and United Kingdom), framework targets, information, public facilities management and carbon taxes in order to increase: the energy efficiency of new and existing residential, commercial and public buildings, including their space heating, cooling and ventilation, water heating and lighting services (via designing, building, renovating and purchasing); the energy efficiency of household appliances, home entertainment devices, office equipment (via manufacturing, retailing and purchasing) and lamps; and the use of alternative energy supplies. Many Parties are beginning (or planning) the wide-scale deployment of smart meters and associated information and energy management services, which will enable households and businesses to be more aware of their energy consumption patterns and to make behavioural and investment decisions accordingly.

### 3. Policies and measures in the non-energy sectors

107. Non-energy sector emissions – agriculture, industrial processes and solvents, and waste – account for 19 per cent of total GHG emissions without LULUCF in Annex I Parties (see figure 5 above). The sources of emissions in the non-energy sector are: agriculture (9 per cent of total GHG emissions), industrial processes and solvents (7 per cent) and waste (3 per cent).

Industrial processes

108. Among the PaMs categorized as industry/industrial processes in the BR2s, the highest estimated impact comes from regulatory measures, followed closely by information, and with lesser impacts from economic measures and voluntary agreements. Examples of some of the largest regulatory measures, information, economic measures and voluntary agreements aimed at the non-energy aspects of industrial processes are provided in table 7.

Table 7
**Examples of key policies and measures in industrial processes**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| United States, Significant new alternatives policy Program | 317 | Regulatory, information |
| United States, Federal air standards for oil and natural gas sector | 48 | Regulatory |
| United States, Natural gas STAR program | 32 | Voluntary agreement, information |
| United Kingdom, New energy supply policies | 25 | Economic, regulatory |
| Japan, Holistic policies to reduce the emissions of fluorinated gases | 19 | Other (law/standard, taxation, budget/subsidy, technology development, awareness-raising, education, voluntary agreement) |
| United States, GreenChill advanced refrigeration partnership | 15 | Voluntary agreement, other (negotiated agreement), information, education |
| European Union, European directive on emissions from air-conditioning systems in motor vehicles (2006/40/EC) | 13 | Regulatory |
| Germany, European Union F-gas regulation (517/2014 and 842/2006) | 10 | Regulatory |
| United Kingdom, Products policy (implemented) | 10 | Regulatory |
| France, European Union F-gas regulation (842/2006) | 8 | Regulatory |

*Abbreviation*: F-gas = fluorinated gas.

109. To reduce emissions from industrial processes, Annex I Parties reported the following: new use of ETSs (EU) and information; the continued use of their previous regulations (Australia, EU, Iceland and Switzerland); reporting; voluntary sectoral commitments (Belgium, France, Japan, Netherlands, Norway and Spain); fiscal incentives (Denmark, Japan, Norway and Slovenia) and research. Annex I Parties also reported the measrues to limit (ban) the use of certain HFCs and PFCs (F-gases) and to improve the manufacturing, handling, use and end-of-life recovery of F-gases; the measures to reduce F-gas emissions from semiconductor manufacture, aluminium production, electric power transmission and distribution, magnesium production and miscellaneous sources; and the measures to reduce $CO_2$ and $N_2O$ emissions through improved operations in cement, lime, ammonia, and adipic acid and nitric acid production.

Agriculture

110. Among the PaMs categorized as agriculture in the BR2s, the highest estimated impact comes from economic measures, followed by information and voluntary agreements. Examples of some of the largest economic measures, information and voluntary agreements aimed at agriculture are provided in table 8.

Table 8
**Examples of key policies and measures in agriculture**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| Kazakhstan, Use of biogas plants in agriculture ($CO_2$ & $CH_4$) | 212 | Other (private investments) |
| United States, Conservation reserve program | 40 | Economic, information |
| United States, Natural resources conservation service | 28 | Voluntary agreement, economic, information |
| France, Energy efficiency certificates | 19 | Economic |
| United Kingdom, Agricultural action plan | 3 | Voluntary agreement, information, education |
| Belarus, State programme of mitigation actions 2013-2020 | 1 | Economic, information, regulatory, research |
| Netherlands, Agrocovenant, with various sectors in horticulture and agricultures | 1 | Voluntary agreement |

111. The policy portfolios to reduce emissions in the agriculture sector have remained broadly the same since the NC6/BR1s. Annex I Parties reported the continued use of their previous fiscal incentives (either directly or within the context of agricultural market reform) and regulations (e.g. the EU nitrates directive), as well as Australia's revised and expanded ERF carbon offset programme (see box 4 above) to reduce $N_2O$ emissions through manure management and optimized use of nitrogen fertilizer, and to reduce $CH_4$ emissions through changes in livestock management. Other climate-focused policies include long-term R&D in Australia and New Zealand.

Land use, land-use change and forestry

112. Among the PaMs categorized as forestry/LULUCF in the BR2s, the highest estimated impact comes from laws/standards, budgets/subsidies, technology development and awareness-raising measures, classified as other policy types, in Japan. Examples of some of the largest PaMs aimed at forestry/LULUCF are provided in table 9.

Table 9
**Examples of key policies and measures in land use, land-use change and forestry**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| Japan, Forest sink strategies | 38 | Other (law/standard, budget/subsidy, technology development, awareness-raising) |
| Japan, Measures for sinks in agricultural soils | 8 | Other (law/standard, budget/subsidy, technology development, awareness-raising) |
| Lithuania, Increasing the national forest area | 2 | Economic, education, regulatory, research, information |
| Belarus, State programme of mitigation actions 2013-2020 | 1 | Economic, information, regulatory, research |
| Switzerland, Measures within forest policy 2020 | 1 | Information |
| Japan, Promotion of urban greening | 1 | Other (law/standard, budget/subsidy, technology development, awareness-raising) |

113. As with agriculture, Parties reported relatively few PaMs aimed at reducing emissions or enhancing removals from the LULUCF sector. While most of the measures

tend to be part of larger policy strategies aimed at rural development, agricultural reform, environmental stewardship and biodiversity, some Parties use voluntary emission offset schemes that are primarily climate focused. Annex I Parties reported the continued use of their previous fiscal measures (subsidies) and regulations (environmental codes) for private land, and public infrastructure and resource management rules and procedures for public land in order: to promote sustainable forest management, taking into account the need to enhance GHG removals through forest sinks and to maintain and enhance biodiversity; to prevent forest fires; to afforest, reforest and manage forests, grassland, wetlands and cropland; and to increase green urban areas.

114. New Zealand offers landowners funding (Afforestation Grant Scheme) to create new forests and AAUs for carbon sequestered (Permanent Forest Sinks Initiative Offers) to make existing forests permanent. Australia's ERF, in which the Clean Energy Regulator purchases GHG emission reductions credited and certified by approved methods, has nine LULUCF-related methods, including: the Reforestation and Afforestation Method for planting trees to grow forest on land that has been used for agriculture; the Emissions Abatement through Savanna Fire Management Method for increasing the proportion of early dry season fires; the Avoided Deforestation Method for protecting native forest from being cleared; and the Avoided Clearing of Native Regrowth Method for protect native regrowth on agricultural land from further clearing.

Waste

115. Among the PaMs categorized as waste management/waste in the BR2s, the highest estimated impact comes from regulatory measures. Examples of some of the largest regulatory measures aimed at waste management/waste are provided in table 10.

Table 10
**Examples of key policies and measures in waste**

| *Party, Policy and measure* | *Estimated impact in 2020 (Mt $CO_2$ eq)* | *Type of policy instrument* |
|---|---|---|
| United States, Landfill air regulations | 262 | Regulatory |
| European Union, Landfill directive (1999/31/EC) | 44 | Regulatory |
| European Union, Waste framework directive (2008/98/EC) | 40 | Regulatory |
| United States, Landfill methane outreach program | 19 | Voluntary agreement, information |
| Portugal, Reducing GHG emissions in the waste sector | 7 | Economic, regulatory, other (planning) |
| Bulgaria, Construction of installations for mechanical and biological treatment (mbt) of waste | 6 | Economic |
| Bulgaria, Capture and burning of biogas in all new and in the existing regional landfills | 5 | Economic, regulatory |
| Croatia, Renewable energy in WEM scenario | 4 | Economic, regulatory, fiscal |

*Abbreviations*: GHG = greenhouse gas, WEM = 'with existing measures'.

116. Building on the success of reducing emissions from the waste sector in many Parties, owing to PaMs that tackle emissions throughout the whole waste life cycle, Annex I Parties continued to use framework targets (EU), regulations (EU, New Zealand and Switzerland), fiscal incentives (EU), voluntary enterprise partnerships (Japan) and resource management (EU) to promote: waste minimization through reduced packaging and increased product and packaging reusability and recyclability; waste reuse through the implementation of waste separation and recycling; minimization of landfilled waste through

processing and incineration; and landfill management with capture or flaring of $CH_4$. A new legislation for waste prevention and reuse was introduced by France (see box 7).

Box 7
**France's waste prevention and reuse**

In France, the Energy Transition for Green Growth Law, enacted in August 2015, promotes a circular economy, from product design to recycling. This includes treating waste as close as possible to where it is produced, banning single-use plastic bags from 1 January 2016, combating food waste, conducting "zero waste, zero wastage" calls for projects and penalizing planned obsolescence. The law sets the following objectives:

- To avoid producing waste through prevention and reuse. The aim is to offset the effects of population growth and economic growth through prevention initiatives and, by 2020, to achieve a 10 per cent reduction in household and similar waste produced per capita (below the 2010 level), and to stabilize waste from economic activities (again below the 2010 level);
- To increase the ratio between gross domestic product and domestic consumption of materials by 30 per cent by 2030 (above the 2010 level);
- To reduce the quantity of non-recyclable manufactured products on the market by 50 per cent before 2020 (below the 2010 level);
- To increase the recovery of unavoidable waste materials by directing 55 per cent of non-hazardous, non-inert waste (by mass) to recovery systems in 2020, and 65 per cent (by mass) in 2025;
- To transform unavoidable waste not suitable for material recovery into energy;
- To reduce landfilling by 30 per cent in 2020, then by 50 per cent in 2025 (below the 2010 level).

## D. Domestic institutional arrangements and measurement, reporting and verification

117. In accordance with the UNFCCC reporting guidelines on BRs, as per decision 2/CP.17, Parties should provide information on changes in their domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards their economy-wide emission reduction targets. This section first discusses the institutional arrangements and then the MRV activities.

### 1. Domestic institutional arrangements

118. Few Parties reported major changes in their domestic institutional arrangements since the BR1s, but most provided brief descriptions of some facets of their institutions. Exceptions were Portugal and Ireland, which established new policy frameworks in 2015 (see boxes 8 and 9, respectively).

Box 8
**Portugal's Strategic Framework for Climate Policy, including the National System for Policies and Measures**

In 2015, Portugal overhauled its political and institutional response to climate change, establishing the Strategic Framework for Climate Policy (QEPiC), an integrated framework of policy instruments for the 2020–2030 time frame.

QEPiC brings together, for the first time, all the main national policy instruments on climate change mitigation and adaptation: the National Programme for Climate Change 2020/2030 and the National Strategy for Adaptation to Climate Change 2020 (ENAAC). It provides a national response to the commitments made for 2020 (under the UNFCCC and the 2020 climate and energy package) and put forward for 2030 in the framework of the European Union (and under the Paris Agreement), and integrates the relevant national targets established under the Green Growth Commitment.

QEPiC also integrates the support elements pertaining to climate change policy, including the National System for the Inventory of Emissions by Sources and Removals by Sinks of Air Pollutants the newly established National System for Policies and Measures (SPeM) and the governance, monitoring and reporting structure for ENAAC. SPeM manages the process of defining policies and measures, elaborating projections and promoting the connection between the national inventory and the emission projections. The governance, monitoring and reporting structure is a new support mechanism to follow-up on policies and measures and projections, to uphold the evaluation of progress in the implementation of sectoral mitigation policies and measures, promoting the engagement and reinforcing the accountability of the different policy sectors in order to mainstream climate policy. The integration of these support mechanisms represents an articulated framework for the implementation and follow-up of the national climate policy, constituting a national reference for monitoring, reporting and verification.

119. In addition, some Parties reported on recent or planned developments of their domestic institutional arrangements. Croatia established a committee for cross-sectoral coordination of PaMs for mitigation and adaptation to climate change in 2014. The committee members included representatives of relevant government bodies and other relevant organizations, agencies and non-governmental organizations.

120. Poland's Act of 12 June 2015, in addition to completing the implementation of the EU ETS into Polish law, created a legal basis for a comprehensive monitoring system of the implementation of PaMs for reducing GHG emissions. A leading role in this monitoring system will be played by KOBiZE, which has been entrusted with: (1) monitoring climate policy measures and preparing analyses, reviews and assessments of their functioning; (2) forecasting the effects of the implementation of climate policy; (3) developing tools to support the implementation of the system for managing emissions and for modelling the economic, financial and social effects of the implementation of climate policy; and (4) integrating environmental reporting systems.

121. Slovenia is developing its national system for PaMs and projections, using its experiences with the national inventory system and with previous reporting to the EU and the UNFCCC on projections and policies. The basics of the system are already in place, though some of the arrangements have yet to be formalized and adequately documented. Slovenia aims to finalize the system during 2016.

Box 9
**Ireland's Climate Action and Low Carbon Development Act**

The Climate Action and Low Carbon Development Act, signed into law in 2015, provides a statutory basis for the national objective of transition to a low-carbon, climate-resilient and environmentally sustainable economy by the year 2050. This provides a solid statutory foundation to the institutional arrangements necessary to pursue and achieve that national transition objective.

Among the key provisions of the act are the preparation and adoption of:

- Successive five-yearly national mitigation plans that will specify the policy measures to be adopted to reduce greenhouse gas (GHG) emissions in Ireland;
- National adaptation frameworks, to be reviewed every five years, which will specify a national strategy for the application of adaptation measures in different sectors and by local authorities to adapt to the inevitable effects of climate change in Ireland.

The act also provides for the establishment of a Climate Change Advisory Council to provide advice and recommendations to ministers and the Government on climate change matters, and requires it to conduct an annual review of progress made in the previous year in achieving GHG emission reductions and furthering transition to a low-carbon economy, and to prepare an annual report on its findings and recommendations.

The act also requires the Minister for the Environment and other relevant ministers to report regularly and transparently on how Ireland is performing towards meeting the objectives and measures set down in the plans, in the form of annual transition statements to both Houses of the Oireachtas (Parliament) on progress made in climate mitigation and adaptation efforts.

## 2. Measurement, reporting and verification

122. The need for rigorous, comprehensive MRV of emissions and PaMs is increasing as Parties seek greater emission reductions and as more government (i.e. regional, national, state/provincial and local/municipal) and private sector organizations take on formal responsibilities and commitments for mitigating climate change. The MRV helps to ensure the progress of and compliance with commitments and regulations, and increases the accountability of entities responsible for actions. It also alerts the need for possible mid-course revisions to PaMs, when real (ex post) results differ from projected (ex ante) performance.

123. Most Parties reported on some aspect of their MRV activities, but there was little consistency in the types of activities and the reporting formats. In general, MRV was discussed in four different, but interrelated, contexts: (1) inventories, projections and compliance with commitments, (2) compliance with devolved commitments, (3) certification and compliance of activities covered by PaMs and (4) measurement and evaluation of the effectiveness and efficiency of PaMs in delivering mitigation results.

Inventories, projections and compliance with commitments

124. Some Parties reported on the MRV used to ensure that accounting systems for inventories, projections and the effects of mitigation actions are compatible, allowing a consistent information system. For that purpose, Australia has implemented, since the BR1, additional quality assurance and quality control activities and procedures in its national inventory system. Belgium, Canada, Finland, United Kingdom and United States have provided extensive documentation of their models and methods for tracking and projecting emissions. France, Germany, New Zealand and United Kingdom have developed or are considering the strengthening of tools for tracking the progress with implementation of their PaMs.

125. France's Ministry of Ecology, Sustainable Development and Energy has developed a tool (known as SceGES, for Scénarisation des Emissions de GES (or GHG emissions scenario writing)) to assess the impact of PaMs, which is harmonized with the national inventory. Germany plans to consider whether and how institutional capacity for emissions reports and PaM impact projection reports needs to be strengthened to ensure international and European reporting obligations can be met, including by a review of the national legal framework relating to the collection and use of data needed for the reports.

126. New Zealand regularly publishes a domestic net position report on its Ministry for the Environment's website, which tracks the country's progress towards meeting its emission reduction target. The United Kingdom established a system to ensure a consistent evaluation of GHG emissions savings across governments as savings estimates from PaMs are prepared and submitted by analytical teams in the relevant policy areas. This includes: quality checks for any unaccounted overlaps and for internal consistency between energy and emissions savings by the analytical teams; templates for submitting savings estimates; and involvement of the Interdepartmental Analysts' Group on Energy and Climate Change offering a cross-government multidisciplinary peer review forum for policy analysis.

Compliance with devolved commitments

127. Some Parties reported on MRV in the context of compliance with devolved commitments. This was a common theme in the reports of EU member States, which have annual targets under the ESD. In this regard, the EU monitoring mechanism regulation (see box 10) requires member States to report annually on GHG emissions and related data and biennially on projections and PaMs. Evaluation is done by the European Commission. The compliance assessment for the first year, 2013, under the ESD will not take place until 2016.

Box 10
**European Union's monitoring mechanism regulation**

The European Union (EU) monitoring mechanism regulation, which enhanced the previous EU greenhouse gas (GHG) monitoring mechanism, came into force in July 2013. It enables the EU to report to the UNFCCC as a single entity, and also to comprehensively track member States' climate actions and progress in order to inform policy. The regulation establishes a mechanism for:

- Reporting and verifying information relating to commitments of the EU and its member States pursuant to the UNFCCC, the Kyoto Protocol and decisions adopted thereunder, and evaluating progress towards meeting those commitments;
- Monitoring, reporting, reviewing and verifying GHG emissions and other information pursuant to Article 6 of Decision No. 406/2009/EC, which sets forth member States' obligations to reduce their GHG emissions to meet the EU GHG emission reduction commitments up to 2020;
- Reporting the use of revenue generated by auctioning allowances under Directive 2003/87/EC, which established the EU Emissions Trading System;
- Monitoring and reporting on the actions taken by member States to adapt to the inevitable consequences of climate change in a cost-effective manner;
- Evaluating progress by the member States towards meeting their obligations, under Decision No. 406/2009/EC, to reduce their GHG emissions to meet the EU GHG emission reduction commitments up to 2020.

128. Belgium has established national rules for taking local action against domestic non-compliance with emission reduction targets. It is based on multiannual trajectories for the reduction of GHG emissions in the residential and tertiary building sectors for each Belgian region, and includes financial bonuses and penalties in the case of over-compliance and non-compliance. Romania is developing rules and procedures for non-compliance with emission reduction targets. In Sweden, municipalities are obliged to have an energy plan, which is often combined with a climate strategy to reduce GHG emissions. An evaluation of existing support for local authorities' climate strategy efforts showed that 88 per cent of

responding municipalities (163 in all) had adopted a climate strategy, or intended to do so shortly.

Certification and compliance of activities covered by policies and measures

129. Some countries reported having MRV mechanisms related to the functioning of certain PaMs. These include: the monitoring and verifying of crediting and purchasing as well as accreditation within crediting or certification mechanisms; the monitoring, reporting and verification of emissions by private sector actors; and the evaluation of the effectiveness of PaMs by national governments.

130. Australia's ERF has crediting methods and a safeguarding mechanism that rely on a strong MRV system. The Clean Energy Regulator has assessed the probity of the three ERF auctions to date. This included monitoring the integrity of the auction process, including the application of the variable volume threshold and assessment of bids. The Australian National Audit Office is currently auditing crediting and purchasing under the ERF.

131. Croatia has established an MRV system for GHG emissions in the lifetime of liquid fuels. In accordance with the Air Protection Act, a supplier that places fuel on the domestic market shall monitor GHG emissions per energy unit during the life of the fuel. Suppliers have to draw up a report that has to be verified and submitted to the Environmental Protection Agency.

132. The EU phase 3 (2013–2020) reforms of the EU ETS have resulted in important changes with regard to domestic institutional arrangements for the MRV of GHG emissions under the EU ETS. There are two European Commission regulations, one specific to monitoring and reporting and the other to verification and accreditation. The latter introduces a framework of rules for the accreditation of verifiers to ensure that they possess the technical competence to perform the entrusted task in an independent and impartial manner and in conformity with the requirements and principles set out in the regulation.

133. The EU adopted a legislative instrument in April 2015 providing for an EU-wide MRV system for $CO_2$ emissions from large ships (over 5,000 gross tonnes) calling at EU ports from 1 January 2018. Companies operating large ships visiting EU ports will have to monitor and annually report on the verified amount of $CO_2$ emitted and additional parameters on journeys to, from and between EU ports. When visiting EU ports, ships must carry a document of compliance issued by an accredited MRV verifier.

134. Hungary's Green Investment System (and presumably its successor, the Green Economy Financing System) can use its resources to support projects with direct effects on GHG emissions and energy efficiency. Monitoring and implementation reports are prepared each year to verify and quantify the amount of direct GHG emission reductions realized through each project.

135. Italy, in December 2012, issued the so-called "White Certificate Decree" concerning the determination of national quantitative targets of energy savings that must be met by electricity and gas distribution companies from 2013 to 2016. The manager of energy services is responsible for the management, assessment and certification of energy saving projects carried out under white certificates.

136. Japan's Government Council conducts an annual review of the progress of national PaMs and voluntary initiatives conducted by business operators under the Commitment to a Law Carbon Society programme. In addition, the Government estimates the GHG emission levels biannually to check the emission trends by sector and by gas.

137. The Netherlands requires many companies, such as those involved in metal processing and chemical production, to publish an annual environmental report in order to encourage them to make production cleaner and more environmentally friendly.

138. In New Zealand, audits are undertaken of the data of its ETS participants to ensure compliance with the system's rules. The Climate Change Response Act 2002 provides for compliance action to enforce the New Zealand ETS obligations, with a substantial financial penalty in addition to repayment of any outstanding emission units. Similar powers apply for any repayment obligations in case of over-allocation.

139. Switzerland reported using MRV to determine future actions. The revised $CO_2$ Act obliges the Swiss Federal Council to periodically evaluate the effectiveness of the PaMs required by the act and to consider the necessity of additional measures. The first evaluations were initiated during 2015.

Measurement and evaluation of the effectiveness and efficiency of policies and measures in delivering mitigation results

140. Additional effort beyond MRV is necessary to help decision makers understand if and how individual PaMs are working, and how they might be made more effective and efficient. This ex post assessment, called measurement and evaluation, is somewhat more challenging than MRV and was reported less frequently by the Parties. Examples are Canada, Germany and Switzerland.

141. In Canada, the Commissioner of the Environment and Sustainable Development, on behalf of the Auditor General of Canada, provides objective, independent analysis and recommendations on the federal government's efforts to protect the environment and foster sustainable development. The commissioner conducts performance audits and is responsible for assessing whether federal government departments are meeting their sustainable development objectives, including on climate change. Reports and audits are tabled in Parliament and provide observations and recommendations for initiatives that require improvement.

142. Germany reports having no comprehensive ex post evaluation of climate change mitigation measures, neither in terms of their effect on the climate nor their effect on the economy. However, the first progress report on the Energiewende analysed, in depth, the contribution of expanding the use of RES and the macroeconomic effects of the Energiewende.

143. Switzerland, while noting the difficulties in identifying the impacts of individual PaMs and their contributions to observed emission reductions, reported that the Federal Office for the Environment has undertaken an evaluation of the emission impacts of the $CO_2$ levy. The report will be published in 2016.

## E. Assessment of the economic and social consequences of response measures

144. In accordance with the UNFCCC reporting guidelines on BRs, each Annex I Party is encouraged to provide, to the extent possible, detailed information on the assessment of the economic and social consequences of response measures.

145. Out of 44 Parties, 27 (e.g. Belgium, EU, France, Norway and Spain) provided information in their BR2s on the assessment of the economic and social consequences of response measures. Some Parties reported ways in which they minimize the adverse effects of the implementation of PaMs, which is related to, but different from, the assessment of the economic and social consequences of PaMs. Some Parties made a reference to their reporting, in their national inventory reports and NC6s, on ways to minimize the adverse effects of the implementation of PaMs under Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol.

146. The EU, France, Greece, Lithuania, Norway, Spain and Sweden described their procedures for the assessment of the impacts of proposed legislation or other policy initiatives. The EU, for example, provided a detailed description of its impact assessment system, which "analyses and addresses all significant economic, social and environmental impacts of possible new initiatives", including all legislative proposals and also other initiatives likely to have far-reaching impacts. The EU reported that all affected stakeholders should be engaged in every impact assessment, that existing international policy dialogues are used to keep third countries informed and that all impact assessments are published online.

147. Some Parties noted that PaMs may have both positive as well as negative economic and social effects. Belgium and France both cited the example of increased use of biofuels, which can result in increased economic activity in developing countries that export biofuels, but which can also have possible negative effects on deforestation and food resources.

148. While several Parties recognized possible impacts on developing countries, Germany and Romania explicitly pointed out that most or all of their implemented national climate change PaMs have had no impact on developing countries and are not expected to have any impact in the future. France and Spain presented, in tabular form, the expected direct and indirect environmental, social and economic effects on developing countries resulting from their most important PaMs, highlighting which effects are expected to be positive and which negative.

# IV. Greenhouse gas emission projections

## A. Overview

149. This chapter presents GHG emission projections for 2020 and 2030 for all Annex I Parties. Information is taken from the BR2s, except for Ukraine that, at the time of preparation of this report, has not yet submitted its BR2. For Ukraine, data were taken from its BR1. The EU provided projections in its BR2; however, those values are not included in the totals in this report in order to avoid double counting. Information is provided for five periods: 1990–2020, 1990–2030, 2020–2030, 2014–2020 and 2014–2030.

150. In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs),[20] Parties are required at a minimum to report projections under the 'with measures' scenario, but may also report projections under the 'with additional measures' and 'without measures' scenarios. The 'with measures' scenario takes into account the effects of PaMs that have either been implemented or adopted. The 'with additional measures' scenario includes the effects of PaMs planned at the time that the projections were prepared. In the 'without measures' scenario, PaMs either implemented, adopted or planned after a year chosen as the starting point for projections are not taken into account.

151. All 43 Annex I Parties reported projections for the 'with measures' scenario; 21 Parties provided projections for the 'with additional measures' scenario and 9 Parties provided projections for the 'without measures' scenario. For the mandatory 'with measures' scenario, all 43 Annex I Parties provided quantitative information for 2020, while 42 Parties reported projections for 2030.

[20] See document FCCC/CP/1999/7, paragraphs 27–48.

152. Table 19 in the annex provides information on the sources of projections used in this report and an overview of the scenarios reported by Annex I Parties.

153. During the period 1990–2020, total aggregate GHG emissions without LULUCF for Annex I Parties are projected to decrease by 13.7 per cent with implemented and adopted PaMs. This is the result of steep emission reductions for EIT Parties (by 41.4 per cent), which mostly occurred at the beginning of the 1990s, and the subsequent economic transformation, combined with the slight decrease in emissions of non-EIT Parties (by 0.4 per cent), which, in part, is attributed to their PaMs. A similar trend is projected for emissions over the period 1990–2030, with a decrease by 14.1 per cent reflecting the continuous effect of PaMs and their strengthening over time, as well as target-driven climate policy by all Parties as at the beginning of the 2010s.

## B. Approaches and assumptions used to prepare projections

154. The models or approaches used by Parties to estimate projections can be broadly classified into four categories: economy-wide macroeconomic models, models to project energy-related GHG emissions, models to project non-energy-related GHG emissions, and models to project GHG emissions and removals from LULUCF. Most Parties provided a detailed explanation of the models and approaches used to project energy-related emissions. Most Parties also provided explanations on how emission and removals were projected from non-energy sectors, but they were usually less detailed than for the energy-related emissions.

155. Most Parties used an integrated approach for projecting energy-related emissions, whereby macroeconomic top-down models were coupled with sector- and technology-specific bottom-up models. However, the type and characteristics of the models differed among Parties.

156. Almost all Parties used spreadsheet models to project emissions from non-energy sources other than LULUCF. These models were based on activity data, emission factors and sector-specific growth assumptions. For the projections of GHG emissions and removals from LULUCF, Parties used models that are broadly consistent with the models used in their GHG inventory, together with the sector-specific assumptions.

157. All Parties except Ukraine reported on the assumptions used in preparing their emission projections. The three key drivers of GHG emissions for most Parties are the average GDP and population growth and the international oil price (see table 20 in the annex). Additional assumptions used by Parties concerned: the expected development of GDP components; the international prices of coal and gas; the level of electricity production and consumption; the number of heating and cooling degree days; and the activity data for some emission drivers, such as industrial production, number of livestock and number of households. Some Parties provided results of sensitivity analysis to assess the potential impacts of changes in their initial assumptions and parameters used for GHG projections.

158. The comparison of projection emission trends across Parties should be undertaken with caution for the following reasons:

(a) The diversity in the use of models and approaches among Parties for estimating projections;

(b) The difference among Parties in the use of key assumptions to which projected emissions are highly sensitive.

## C. Projected total aggregated greenhouse gas emissions

159. This section deals with the projections of total GHG emissions with and without LULUCF, for 2020 and 2030, reported for the 'with measures', 'with additional measures' and 'without measures' scenarios.

160. Varying numbers of Parties reported projections for the three scenarios and for the years 2020 and 2030, but all Parties reported information under the 'with measures' scenario for 2020. In order to have a comparable set of data allowing for a rough comparison of the total GHG emissions of all Parties in 2020 and 2030, the following approaches were used: (1) where projection estimates were missing for 2030, data reported for 2020 were assumed to remain the same for 2030 and (2) where the 'with additional measures' scenario was not reported, data for the 'with measures' scenario were used.

### 1. Projections without emissions/removals from land use, land-use change and forestry

Projections under the 'with measures' scenario

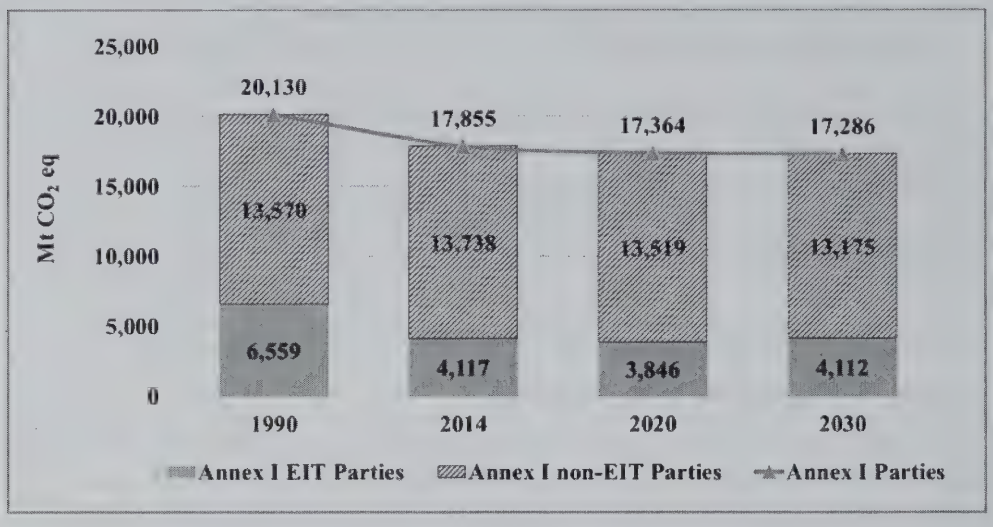
161. All 43 Annex I Parties provided projections under the 'with measures' scenario for 2020, while one Party (Australia) did not report projections for 2030.

162. In the period 1990–2020, an overall decrease in GHG emissions for all Annex I Parties by 13.7 per cent is projected, from 20,130 Mt $CO_2$ eq to 17,364 Mt $CO_2$ eq. This is the result of the substantial emission reductions (41.4 per cent) of EIT Parties and the modest decrease in emissions of non-EIT Parties (0.4 per cent). The projected decrease in total aggregate GHG emissions in 2030 compared to the 1990 level (14.1 per cent) is slightly lower because of the projected further decrease in emissions (0.4 per cent) between 2020 and 2030. GHG emissions in 2020 and 2030 are projected to decrease by 2.8 per cent and 3.2 per cent below the 2014 level, respectively. Figure 13 shows the total projected GHG emissions without LULUCF in 2020 and 2030.

163. For the periods 1990–2020 and 1990–2030, emissions for EIT Parties are projected to drop significantly (41.4 per cent and 37.3 per cent, respectively), reflecting significant emission decreases in the 1990s. On the other hand, a 6.9 per cent increase in emissions is projected between 2020 and 2030. The projected decreases in GHG emissions for this group of Parties are more moderate: 6.6 per cent in 2020 and 0.1 per cent in 2030, below the 2014 level, which was the latest available GHG inventory year.

164. For non-EIT Annex I Parties, a slight decrease in emissions is projected for 1990–2020 (0.4 per cent), as well as for 1990–2030 (2.9 per cent). Emissions in 2030 are projected to decrease by 2.5 per cent below the 2020 level. Emissions in both 2020 and 2030 are projected to decrease below the 2014 level (1.6 per cent and 4.1 per cent, respectively), which, at least in part, can be attributed to the effects of PaMs in these countries. Emissions from non-EIT Parties continue to account for the largest share of total aggregate GHG emissions of Annex I Parties in 2020 (77.9 per cent of the total) and 2030 (76.2 per cent of the total).

Figure 13
**Projected greenhouse gas emissions without land use, land-use change and forestry in 2020 and 2030 under the 'with measures' scenario**



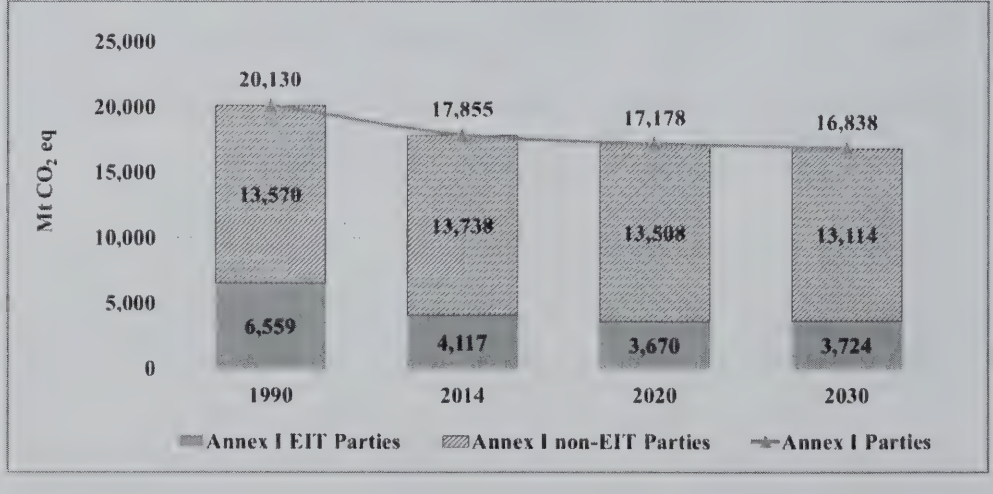

*Abbreviations*: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

Projections under the 'with additional measures' scenario

165. The 21 Parties that have reported projections under the 'with additional measures' scenario provided data for both 2020 and 2030. Projected emissions in 2020 for these Parties account for 22.7 per cent of the total emissions without LULUCF in 1990.

166. Using the approaches described in paragraphs 154–157 above, total GHG emissions are projected to decrease from 20,130 Mt $CO_2$ eq in 1990 to 17,180 Mt $CO_2$ eq in 2020, or by 14.7 per cent (see figure 14). Emissions are also projected to decrease over the period 1990–2030, but by a slightly higher amount (16.3 per cent). This is due to the 2.0 per cent projected decrease in emissions during the period 2020–2030. Decreases in emissions are also projected by 2020 (3.8 per cent) and 2030 (5.7 per cent), compared to the 2014 level.

Figure 14
**Projected greenhouse gas emissions without land use, land-use change and forestry in 2020 and 2030 under the 'with additional measures' scenario**



*Abbreviations*: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

Projections under the 'without measures' scenario

167. Nine Parties (Croatia, Cyprus, New Zealand, Romania, Russian Federation, Slovakia, Switzerland, Turkey and Ukraine) reported projections under the 'without measures' scenario for 2020 and 2030.

168. For that group of Parties, GHG emissions without LULUCF are projected to decrease by 21.1 per cent, from 5,628 Mt $CO_2$ eq to 4,439 Mt $CO_2$ eq, during the period 1990–2020.

## 2. Projections with emissions/removals from land use, land-use change and forestry

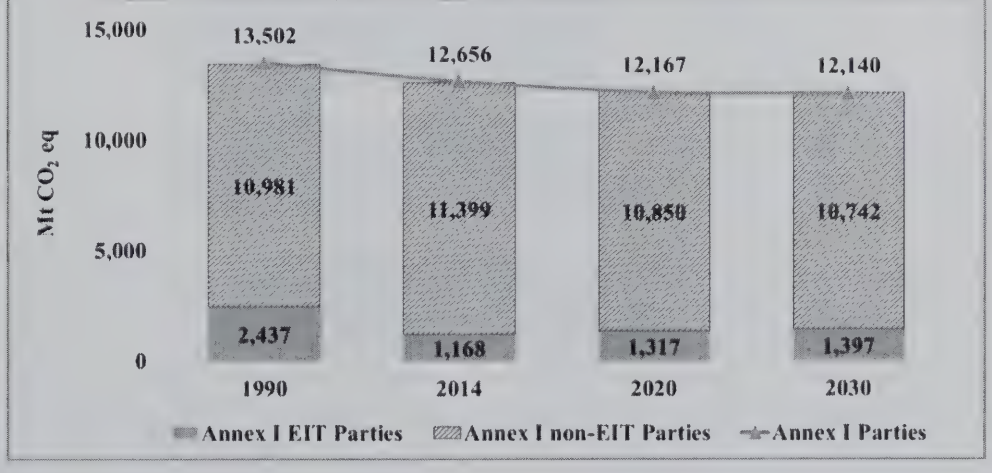
169. Thirty-three Parties reported projections of total GHG emissions with LULUCF under the 'with measures' scenario. All of these Parties reported data for 2020 and 2030; however, one Party (Australia) did not provide such information for 2030.

170. As presented in figure 15, for the 33 Parties taken together, a decline in total aggregate GHG emissions with LULUCF by 9.9 per cent compared to the 1990 level is projected in 2020. Due to a 0.2 per cent projected decrease in emissions between 2020 and 2030, projections for 2030 show emissions over the period 1990–2030 decreasing by 10.1 per cent. Emission reductions are projected to occur in 2020 and 2030 (3.9 per cent and 4.1 per cent, respectively, compared to the 2014 level) for this same group of Parties.

171. For comparison, the total GHG emissions without LULUCF for the same group of 33 Parties are projected to amount to 13,784 Mt $CO_2$ eq in 2020, representing a reduction of 5.2 per cent compared to the 1990 level (14,547 Mt $CO_2$ eq). Emissions without LULUCF in 2030 (13,659 Mt $CO_2$ eq) are projected to be 6.1 per cent lower than the 1990 level. From 2020 to 2030, emissions without LULUCF for this group are projected to decrease by 0.9 per cent.

172. As the number of Parties covered in the projections in 2020 for GHG emissions with and without LULUCF varies, interpretation of the considerable difference in projected emission trends between figures 13 and 15 should be undertaken with caution.

Figure 15
**Projected greenhouse gas emissions with land use, land-use change and forestry in 2020 and 2030 under the 'with measures' scenario**



*Abbreviations*: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

## D. Greenhouse gas emission projections by sector

### 1. Projected changes in sectoral greenhouse gas emissions under the 'with measures' scenario

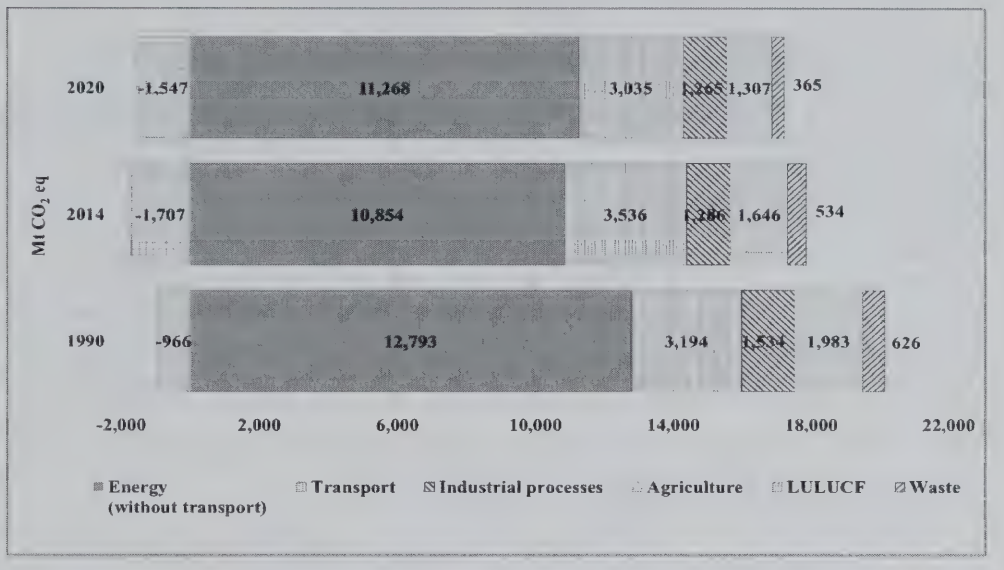
173. All Annex I Parties provided projections by sector for 2020 and 2030, whereas one Party (Australia) did not provide sectoral projections for 2030. Therefore, the sectoral assessment for 2030 does not include Australia. The Russian Federation reported emissions only for the energy sector (excluding transport). Furthermore, not all Parties reported projections for all sectors. Hence, the comparison of rate of change of projected emissions in 2020 and 2030 from the 1990 and 2010 levels across the sectors should be interpreted with caution.

174. Figure 16 presents the emission projections for 2020 under the 'with measures' scenario, by sector. For all Parties taken together, emissions from all sectors are projected to decrease over the period 1990–2020. On the other hand, for the period 2014–2020, emissions from the energy sector (excluding transport) are projected to increase by 3.8 per cent. The removals from the LULUCF sector in 2020 are projected to increase by 60.2 per cent compared to the 1990 level, but are projected to decrease by 9.4 per cent compared to the 2014 level.

175. The projected GHG emissions show that the energy sector (including transport) will remain the dominant source of GHG emissions in 2020, contributing 83.0 per cent of the total GHG emissions. GHG emissions from the energy sector (excluding transport) are projected to decrease by 11.9 per cent from 12,793 Mt $CO_2$ eq in 1990 to 11,268 Mt $CO_2$ eq in 2020. GHG emissions from the transport sector are also projected to drop (by 5.0 per cent) from 3,194 Mt $CO_2$ eq to 3,035 Mt $CO_2$ eq. In contrast, emissions from energy (excluding transport) in 2020 are projected to increase by 3.8 per cent compared to 2014. In the same period, a decline in emissions from the transport sector is projected (by 14.2 per cent).

Figure 16

**Projected greenhouse gas emissions/removals under the 'with measures' scenario, by sector, in 2020**



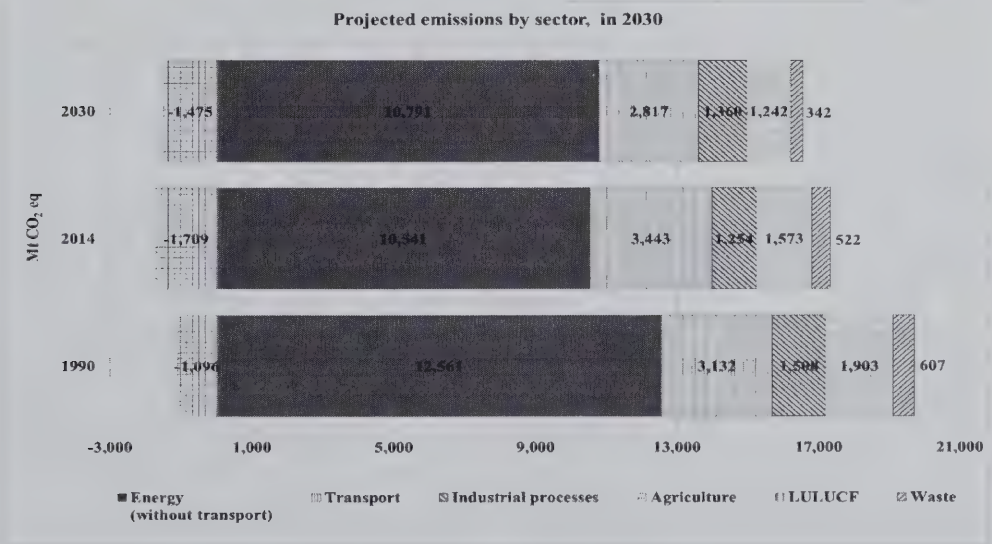

*Note*: Because of the difference in the number of Parties covered, emissions for individual sectors may not necessarily be consistent with the national totals given elsewhere in this document.

*Abbreviation*: LULUCF = land use, land-use change and forestry.

176. Taking into account the sectoral data provided by Parties for 2030, the projected changes are consistent with those for the period 1990–2020. Emissions from 1990 to 2030 from all sectors are also projected to decrease but at a higher rate (except for the industrial processes sector). The removals in the LULUCF sector are projected to increase at a lower rate (34.6 per cent). Figure 17 shows the emission projections for 2030 under the 'with measures' scenario, by sector.

Figure 17

**Projected greenhouse gas emissions/removals under the 'with measures' scenario, by sector, in 2030**



*Note*: Because of the difference in the number of Parties covered, emissions for individual sectors may not necessarily be consistent with the national totals given elsewhere in this document.

*Abbreviation*: LULUCF = land use, land-use change and forestry.

### 2. Projected changes in greenhouse gas emissions from international bunker fuels

177. Fifteen Parties (Estonia, EU, Finland, Germany, Greece, Hungary, Iceland, Ireland, Netherlands, New Zealand, Slovakia, Slovenia, Sweden, United Kingdom and United States) reported projections of GHG emissions from international bunker fuels.

178. Using the data provided by the EU and the non-EU Parties, GHG emissions from fuel use for international bunkers are projected to increase from 286 Mt $CO_2$ eq in 1990 to 419 Mt $CO_2$ eq in 2020, representing an increase of 46.4 per cent. From 1990 to 2030, the projected increase in these emissions is even higher (59.3 per cent). GHG emissions from international bunkers are projected to increase by 8.8 per cent between 2020 and 2030. These values cover a very limited set of Parties and therefore may not be representative of this sector.

## E. Projection data for individual Annex I Parties

179. Projected percentage changes in GHG emissions for individual Annex I Parties by 2020 compared with the 1990 and 2014 levels under the 'with measures' are provided in figure 18. This information is presented in tabular format in tables 21 and 22 in the annex, including data reported under the 'with additional measures' and 'without measures' scenarios.

180. The projected total aggregate GHG emissions for Annex I Parties are influenced mainly by the emissions of the United States, Russian Federation, Japan, Germany and Canada, which account for slightly over 70 per cent of the total emissions for Annex I Parties in 2020 under the 'with measures' scenario. Some of the key aspects of their projected GHG emission profiles are as follows:

(a) The United States has projected its GHG emissions to increase from 6,581 Mt $CO_2$ eq in 1990 to 6,614 Mt $CO_2$ eq in 2020 (a small increase of 0.5 per cent), but decrease to 6,364 Mt $CO_2$ eq in 2030 (an overall reduction of 3.3 per cent over the period 1990–2030);

(b) The GHG emissions of the Russian Federation are projected to decrease from 3,940 Mt $CO_2$ eq to 2,400 Mt $CO_2$ eq between 1990 and 2020 (a 39.1 per cent reduction that mostly occurred in the 1990s), but then increase between 2020 and 2030 (by 7.9 per cent), resulting in a projected decline in emissions in the period 1990–2030 of 34.3 per cent;

(c) For Japan's GHG emissions by 2020, an increase of 10.1 per cent is projected, from 1,271 Mt $CO_2$ eq in 1990 to 1,399 Mt $CO_2$ eq in 2020, but they are then projected to decrease in 2030 to 1,079 Mt $CO_2$ eq;

(d) A decline in Germany's GHG emissions is projected between 1990 and 2020 (−33.1 per cent, which mostly occurred in the 1990s), from 1,246 Mt $CO_2$ eq to 833 Mt $CO_2$ eq, with a further decrease by 2030 to 707 Mt $CO_2$ eq;

(e) Canada's GHG emissions are projected to increase from 613 Mt $CO_2$ eq in 1990 to 768 Mt $CO_2$ eq in 2020 (a 19.5 per cent increase) and to 814 Mt $CO_2$ eq in 2030.

181. For the 'with measures' scenario, the individual projected changes in total aggregate GHG emissions without LULUCF varied as follows:

(a) Between 1990 and 2020, projected changes varied strongly. Romania showed the largest decrease (57.9 per cent), followed by Lithuania, Latvia and Ukraine, with decreases above 50 per cent. Turkey showed a considerable increase of 222.1 per cent, followed by Australia with an increase of 36.5 per cent;

(b) Between 2014 and 2020, projected changes were less than 50 per cent. Malta showed the largest decrease (37.5 per cent), followed by Monaco, while Turkey showed an increase of 43.1 per cent, followed by Ukraine.

182. A total of 33 Parties reported projection estimates for total GHG emissions with LULUCF under the 'with measures' scenario for 2020. For this group, individual projected changes in total aggregate GHG emissions varied broadly as follows:

(a) From 1990 to 2020, the largest decrease is by 71.4 per cent (Lithuania) and the highest increase is by 237.5 per cent (Turkey);

(b) From 2014 to 2020, the largest decrease is by 37.5 per cent (Malta) and the highest increase is by 219.7 per cent (Sweden).

183. Forty-two Parties reported projections of GHG emissions without LULUCF under the 'with measures' scenario for 2030. The ranges of values are as follows:

(a) For the period 1990–2030, the extent of change is from a decrease of 55.7 per cent (Estonia) to an increase of 380.7 per cent (Turkey);

(b) For the period 2014–2030, the extent of the change ranged from a decrease of 37.0 per cent (Malta) to an increase of 113.6 per cent (Turkey).

184. Thirty-two Parties reported projections of GHG emissions with LULUCF under the 'with measures' scenario for 2030. The ranges of values are as follows:

(a) From a decrease of 66.8 per cent (Lithuania) to an increase of 423.2 per cent (Turkey) compared to the 1990 level, respectively;

(b) From a decrease of 37.1 per cent (Malta) to an increase of 186.3 per cent (Sweden) compared to the 2014 level, respectively.

185. For the 'with additional measures' scenario, 21 Parties provided information on projections for total GHG emissions without LULUCF for both 2020 and 2030 as follows:

(a) From 1990 to 2020, Romania showed the largest decrease (58.8 per cent) followed by Latvia, Lithuania and Ukraine, whereas Spain, Cyprus and Portugal showed an increase (20.5 per cent, 7.3 per cent and 4.0 per cent, respectively). Over the period 1990–2030, the individual projected changes ranged from Estonia with a 59.8 per cent decrease to Spain and Cyprus with increases of 33.4 per cent and 2.9 per cent, respectively;

(b) From 2014 to 2020, the largest decrease was 28.0 per cent (Cyprus) while the highest increase was also 28.0 per cent (Ukraine). For the period 2014–2030, Switzerland showed a decrease of 34.9 per cent, whereas Ukraine showed an increase of 47.4 per cent.

186. For total GHG emissions with LULUCF under the 'with additional measures' scenario, 16 Parties reported information for 2020 and 2030 as follows:

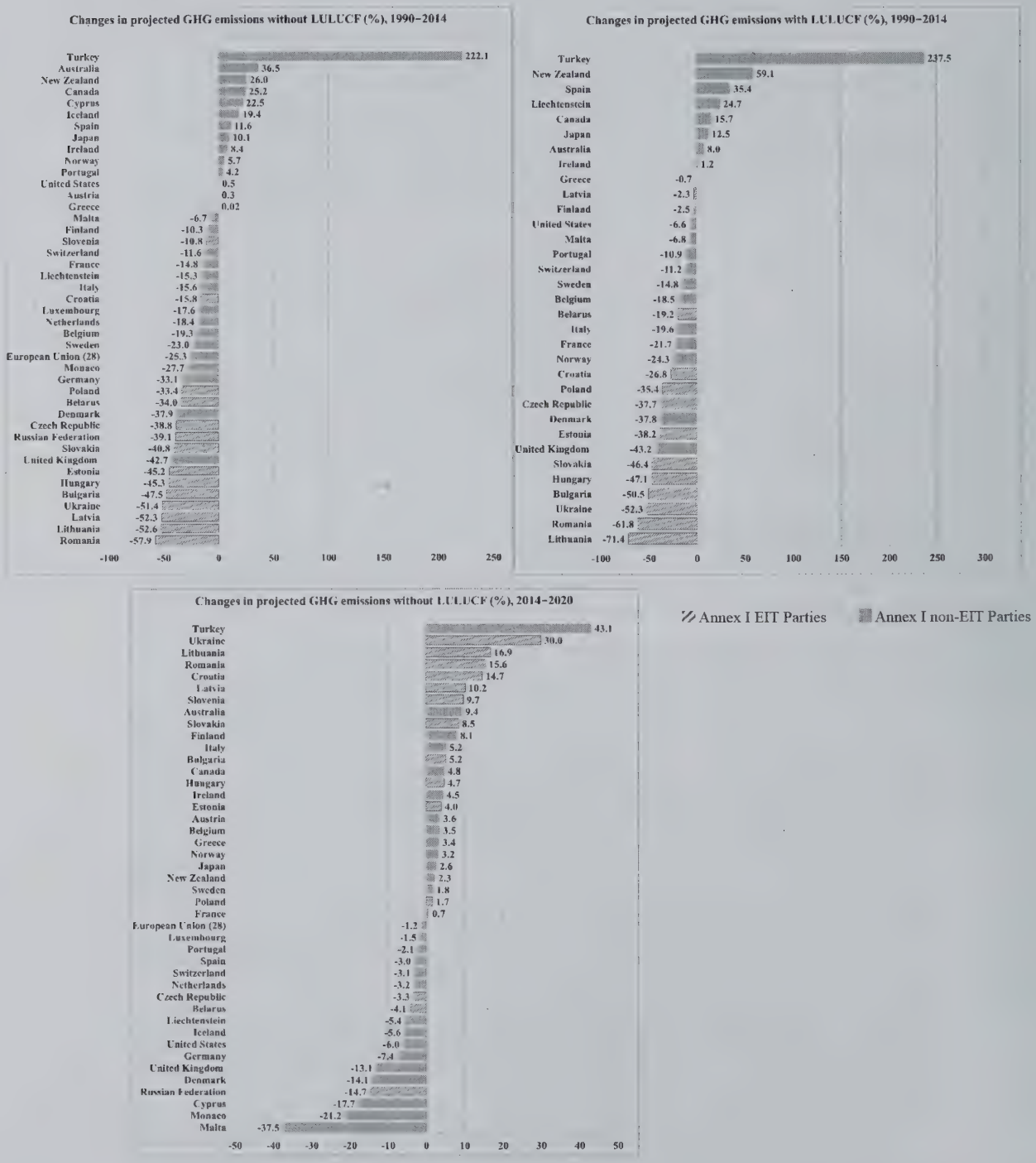
(a) For the period 1990–2020, the changes ranged from a decrease of 76.2 per cent (Lithuania) to an increase of 19.4 per cent (Spain). Individual projected changes in GHG emissions with LULUCF in 2030 from the 1990 level ranged from a decrease of 82.7 per cent (Lithuania) to an increase of 33.8 per cent (Spain);

(b) Over the period 2014–2020, the changes ranged from a decrease of 9.8 per cent (Cyprus) to an increase of 39.9 per cent (Finland). Between 2014 and 2030, the

changes ranged from Lithuania with a decrease of 31.7 per cent to Romania with an increase of 42.7 per cent.

Figure 18

**Projected changes in the total aggregate greenhouse gas emissions of individual Annex I Parties under the 'with measures' scenario by 2020 compared with the 1990 and 2014 levels**




*Abbreviations*: EIT Parties = Parties with economies in transition, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

# V. Provision of financial, technological and capacity-building support to developing country Parties

## A. Overview

187. In accordance with chapter VI of the UNFCCC reporting guidelines on BRs, Parties included in Annex II to the Convention (Annex II Parties) are required to provide information on the provision of financial, technological and capacity-building support to Parties not included in Annex I to the Convention (non-Annex I Parties). On financial support, three CTF tables are of relevance: CTF table 7 for summary information on the provision of public support for a given year; CTF table 7(a) for information on the provision of public financial support via contributions through multilateral channels for a given year; and CTF table 7(b) for information on the provision of public financial support via contributions through bilateral, regional and other channels in a given year. On technology, CTF table 8 provides information on the provision of support for technology development and transfer. Finally, CTF table 9 covers the reporting of the provision of capacity-building support.

188. With regard to financial resources, Annex II Parties provided extensive quantitative and qualitative information in response to the reporting requirements. Most of the trends that were identified for the BR1s continued to manifest themselves in the BR2s. The information provided shows a clear and significant increase in the provision of financial support between the years 2011–2012 and 2013–2014, with an increase of funding channelled through multilateral financial institutions, including dedicated multilateral climate change funds. The larger portion of public financial support was provided through bilateral, regional and other channels.

189. On technological support, almost all Annex II Parties provided information on steps they took to promote, facilitate and finance the transfer of, or access to, climate technologies to non-Annex I Parties. Like the BR1s, Annex II Parties continue to provide technology support primarily for assisting developing country Parties to reduce GHGs emissions. In particular, many activities related to renewable energy technologies and energy efficiency. Support for adaptation technology activities has grown significantly since the BR1s, with such activities now accounting for 40 per cent of all reported activities. The most frequently reported adaptation technologies were for the agriculture sector. Like the BR1s, reported activities were predominantly related to the later stages of the technology cycle. More than half of all reported technology activities related to the transfer or deployment of mature climate technologies.

190. Regarding capacity-building, an increase in the number of activities reported in support of capacity-building grew substantially between the BR1s and the BR2s, from 292 activities to 400 activities. Within these, the proportion of activities reported supporting adaptation and multiple areas grew, while those in support of mitigation and technology objectives decreased. In terms of regional distribution, all regions saw an increase in the percentage of activities reported. Also, approximately half of the reported activities targeted building capacity for individuals, while fewer (30 per cent) targeted institutions and the least aimed to build system-wide capacity (22 per cent). Most Annex II Parties noted the cross-cutting nature of capacity-building and indicated that it was mainstreamed into activities reported in other sections of their BR2s.

## B. Climate finance

### 1. Introduction

191. In accordance with the reporting guidelines,[21] Annex II Parties provided quantitative as well as qualitative information in their BR2s, including descriptions of the programmes, projects and initiatives supported by them or actions taken in the area of climate change. The information provided addresses adaptation and mitigation activities that were supported by Annex II Parties through multilateral and bilateral channels, including support directed towards clean energy, energy efficiency, forestry, sustainable landscapes, land use, transport, capacity-building and REDD-plus[22] (see, for example, box 11 below).

192. In general, Annex II Parties have significantly increased the qualitative information reported in their BR2s compared to their BR1s, particularly relating to methodological issues, as well as private finance. While fewer reporting issues could be identified compared with the NC6s/BR1s, Annex II Parties continued to use different methodological approaches to the provision of financial data. It is encouraging that several Annex I Parties provided information on climate finance in their respective BR2s/CTF tables on a voluntary basis.

### 2. Trends in the provision of climate finance information

193. Annex II Parties continue to report on multilateral and bilateral channels in the provision of financial resources for the implementation of the Convention, with a significant increase in funds provided in comparison with the previous reporting period. Official development assistance (ODA) remains the dominant source of climate finance, of which the larger portion of funding was labelled as being climate specific. It was further noted that Annex II Parties mainly used grants as a financial instrument, followed by concessional loans and non-concessional loans, and funds continue to flow through bilateral, regional and other channels.

194. Annex II Parties reported continuous provision of funding to the Global Environment Facility (GEF), the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), as well as to the Adaptation Fund. They also reported provision of funding to the Green Climate Fund (GCF) and through multilateral financial institutions, including regional development banks. Overall, climate public finance provided through dedicated climate funds under the Convention and other channels, categorized as core/general, has increased. A large part of those resources flowed through financial channels outside the Convention.

195. Notwithstanding the improvements in reporting that can be observed in the BR2s compared to the NC6/BR1 data,[23] the following reporting issues complicating the aggregation, comparison and analysis of the data remained. These included differences in the:

(a) Amounts provided in summary information/totals versus detailed information, and amounts provided in the BR2s versus the CTF tables;

[21] Contained in the UNFCCC biennial reporting guidelines for developed country Parties (decision 2/CP.17, annex I).

[22] In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

[23] See document FCCC/SBI/2014/INF.20/Add.1, paragraphs 269–271.

(b) Approaches to rounding, use of units (e.g. millions versus thousands) and types of different currencies within reports;

(c) Currency used;[24]

(d) Reporting period (i.e. calendar year versus fiscal or financial year);

(e) Approach to the use of "not applicable" versus not providing any information in the CTF tables for specific categories;

(f) Approach with regard to the provision of sector-related information. For example, in some cases, Parties did not provide any information, and in some other cases, Parties categorized a data entry as attributable to more than one sector. In most cases, the ratio between sectors indicated in such a manner was not reproducible, and this report has introduced a category of "multisectoral" to capture data labelled in such a manner.

## 3. Developments in climate finance since the submission of the sixth national communications/first biennial reports

196. Annex II Parties continued to prepare and submit information on climate finance throughout the negotiation period leading to the adoption of the Paris Agreement at the twenty-first session of the Conference of the Parties (COP), which contains a series of provisions worth highlighting in the context of how reporting on climate finance has evolved since the submissions of the NC6s. In the context of the Paris Agreement, developed country Parties shall biennially communicate indicative quantitative and qualitative information related to paragraphs 1 and 3 of Article 9, as applicable, including, as available, projected levels of public financial resources to be provided to developing country Parties; other Parties providing resources are encouraged to communicate biennially such information on a voluntary basis.[25] The COP also decided to initiate a process for identifying the information to be provided by Parties, at COP 22.[26]

197. The Paris Agreement also established an enhanced transparency framework for action and support, with built-in flexibility that takes into account Parties' different capacities and builds upon collective experience.[27] The purpose of the framework for transparency of support is to provide clarity on support provided and received by relevant individual Parties, and, to the extent possible, to provide a full overview of aggregate financial support provided, to inform the global stocktake under Article 14.[28] In line with this, developed country Parties are to provide transparent and consistent information on support for developing country Parties provided and mobilized through public interventions biennially in accordance with the modalities, procedures and guidelines to be adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.[29] The Subsidiary Body for Scientific and Technological Advice was furthermore requested to develop modalities for the accounting of financial resources provided and mobilized through public interventions in accordance with Article 9, paragraph 7.[30]

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[24] For Parties that did not provide information in USD, the financial data provided in a national currency was converted to USD using exchange rates from the data set of financial indicators of the Organisation for Economic Co-operation and Development for the relevant years.

[25] Article 9, paragraph 5, of the Paris Agreement.

[26] Decision 1/CP.21, paragraph 55.

[27] Article 13, paragraph 1, of the Paris Agreement.

[28] Article 13, paragraph 6, of the Paris Agreement.

[29] Article 9, paragraph 7, of the Paris Agreement.

[30] Decision 1/CP.21, paragraph 57.

198. In a decision on methodologies for the reporting of financial information by Annex I Parties, the COP decided to enhance the consistency and transparency through adjustments in the reporting parameters in CTF tables 7, 7(a) and 7(b) for the UNFCCC reporting guidelines on BRs through various measures.[31] Annex II Parties were also requested to continue to provide information on the underlying assumptions and the methodologies used in their BRs.[32] The Subsidiary Body for Implementation was further invited to take into consideration the adjustments in its revision of the UNFCCC reporting guidelines on NCs, to be completed at COP 22.[33]

### 4. Methodological issues relating to tracking the provision of financial support

Public climate finance

199. Annex II Parties provided extensive qualitative information in response to the requirements of the UNFCCC reporting guidelines on BRs. Some Parties also provided information beyond the requirements as per the reporting guidelines in order to reflect recent developments in the UNFCCC process on climate finance.

"New and additional"

200. Most Annex II Parties stated that financial resources provided were "new and additional" pursuant to Article 4, paragraph 3, of the Convention. However, not all Parties provided detailed information on how they determined that such resources are considered "new and additional". A number of Annex II Parties noted that there is no internationally agreed definition of what counts as "new and additional" financial resources and explained the approaches that they took in defining the financial resources as being "new and additional". Some Parties made reference to pledges made to the GCF in the context of its initial resource mobilization process.

201. Several Annex II Parties, including Belgium, Denmark, Ireland, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom, reported that the climate finance provided can be considered as "new and additional" as it was not diverted from other development priorities. For example, Norway highlighted that "new and additional" finance is drawn from its growing aid programme and does not divert funds from existing development priorities or programmes. Similarly to Sweden, Norway reported that its ODA has not only exceeded 0.7 per cent of the gross national income for many years, but has remained at around 1 per cent for the last few years.

202. Other Annex II Parties, such as Austria, Australia, EU, Germany, Japan, Netherlands and United States acknowledged that the climate finance that they reported in their BR2s represented newly committed or disbursed funds, stating that previously committed or disbursed climate finance was not included in their BR2s. For example, the EU stated that the financial resources reported in its BR2 are considered to be "new and additional" resources as they were committed after and not included in the previous national communication or BR1. Australia and the United States indicated that they source their climate finance from "new and additional" budgets approved by their national legislative bodies.

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[31] Decision 9/CP.21, paragraph 6, which included: the creation of reporting fields for the provision of information on definitions or methodologies used for reporting information; improving the software for tables 7, 7(a) and 7(b) of the CTF; and aligning the categorization in the reporting parameter "status" of support in CTF tables 7, 7(a) and 7(b) with the categorization used in other existing international methodologies.

[32] Decision 9/CP.21, paragraph 9.

[33] Decision 9/CP.21, paragraph 15.

203. A few Annex II Parties made reference to the Copenhagen Accord and pledges made therein using climate finance prior to 2009 as a baseline. For example, Finland indicated that it decided to use the year 2009 as a baseline for defining "new and additional" funding, while Belgium reported on a separate national budget line that was created after COP 15 for multilateral climate finance.

Development Assistance Committee of the Organisation for Economic Co-operation and Development system of Rio markers

204. Many Parties utilize the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD) system of Rio markers for the tracking of bilateral, regional and multilateral contributions, which has been integrated into their own monitoring and reporting system. Some Parties also included specific information on their use of the Rio markers, including on matters related to definitions and double counting. Reference was also made to the OECD initiatives to improve transparency on public and private climate finance, including options to improve the quality and robustness of the Rio markers and their implementation. In some cases, Parties also provided specific information on the financial instruments used.

205. Parties included information on some limitations of the Rio markers such as: the need for translating the data into estimated climate finance flows and working towards tracking climate relevant disbursements; the need for follow-up work to obtain quantitative results because the Rio markers provide qualitative rather than quantitative information; and the need for specific actions to avoid double counting in the use of Rio markers.

206. Parties reported efforts to address the constraints mentioned in paragraph 205 such as the initiation of a system to standardize the quantification of climate-related finance on the basis of the DAC Rio markers, and a review carried out since the BR1s on the use of the Rio markers, which resulted in many small changes and, overall, a more consistent approach to using the Rio markers. A change in the format of new project approval documents to include an explicit question to indicate the applicability of Rio markers was also introduced.

## 5. Private climate finance

207. In accordance with the UNFCCC reporting guidelines on BRs, Annex II Parties are encouraged to report, to the extent possible, on private financial flows. Accordingly, Annex II Parties provided information on private finance, highlighting its key and growing role in scaling up climate finance to put countries on the pathway towards low-carbon and climate-resilient economies, while underlining the continued importance of public climate finance and its leveraging potential.

208. Many Annex II Parties have put in place a wide range of PaMs that promote the scaling up of private investment, such as: (1) combining public contributions with targeted, smart policies to mobilize maximum private investment in climate-friendly activities; (2) expanding and leveraging available resources for development by linking grant aid with market financing; (3) utilizing regional blending mechanisms in order to use grant funding to leverage financing from other sources; (4) strengthening efforts to create instruments and platforms that support leveraging of financing from multiple sources, in particular from the private sector; and (5) contributing to sustainable financial markets in partner countries. Concrete initiatives included: (1) the initiation of a process to consider opportunities for risk mitigation to climate-related investment opportunities in developing countries; (2) the establishment of a mechanism to leverage private investment by use of public finance; and (3) the establishment of a business initiative creating opportunities through long-term collaboration between governments and the business sector.

209. In addition, with regard to private finance, some Parties acknowledged a number of issues, such as: (1) the need to use a variety of instruments, including the integration of environmental considerations into investment and lending decisions, as well as the tailoring of instruments to address barriers and risks; (2) the importance of developing new and innovative financing tools (such as blending) and instruments (such as investment grant or interest rate subsidies, technical assistance, risk capital, risk mitigation instruments, focused credit lines or guarantees); and (3) the testing of new and innovative approaches that can be replicated and scaled up.

210. Parties noted the following challenges in tracking private climate finance such as the difficulties in distinguishing the origin of private finance and the causality of mobilization of private finance, confidentiality clauses related to some private sector data, and the lack of data-collection systems. At the same time, many Parties made reference to ongoing work to improve methodologies for tracking leveraged private sector investment in the context of the OECD Research Collaborative on Tracking Private Climate Finance, and joint initiatives, such as a common reporting method for mobilized private climate finance adopted by a group of donors in 2015 on the basis of which donor countries would submit a joint report.

### 6. Mitigation and adaptation needs of non-Annex I Parties

211. Many Parties highlighted the need to follow a country-driven approach and promote national ownership in climate finance for developing country Parties. Another area highlighted by many refers to the provision of capacity-building support to and the strengthening of national planning capacities, processes and institutions, public financial management and procedures, including the identification, development and dissemination of climate adaptation planning and strategies, as well as increased technology transfer and innovation in the field of adaptation.

212. Many Parties also highlighted the need for integration of climate change policies and considerations into: external and bilateral relations; development cooperation strategies and programmes, particularly with regard to engagement in new areas of work such as combined adaptation and disaster risk reduction efforts; poverty reduction and development efforts; and gender considerations in climate finance. A few Parties also highlighted the need for the development of an effective national and international climate finance architecture, including the need to ensure the participation of developing countries in the board-level decision-making processes of multilateral institutions. Some Parties also made reference to the need for applying the general principles of the Paris/Accra/Busan Agenda on Aid Effectiveness, as well as the need to promote a common and comprehensive approach to financing for development, emphasizing mutually reinforcing climate and development co-benefits.

Box 11

**Examples of support for forest-related activities**

Various Parties provided information on forest-related activities, including finance for REDD-plus.[a] Examples included: providing support to initiatives involving sustainability standards for renewable commodities; enabling stronger community-led forest management; institutional capacity-building; providing data and information about forests and land use; creation of new models for rural development generating climate benefits; increasing measuring, reporting and verification of forest cover and greenhouse gas emission reductions; developing investment strategies that include improving forest governance; supporting the implementation of demand-side measures; creating new finance structures that attract private capital; providing finance for verified emission reductions

associated with avoided deforestation; and use of public–private partnerships to collaborate on reducing deforestation.

Support provided to specific initiatives and programmes was also identified by various Parties in this context, including to: the Forest Carbon Partnership Facility; the Forest Investment Program; the Forest Governance, Markets and Climate; the Investments in Forests and Sustainable Land Use; the ASEAN-Swiss Partnership on Social Forestry & Climate Change; the Tropical Forest Alliance 2020; and the BioCarbon Fund Initiative for Sustainable Forest Landscapes.

[a] In decision 1/CP.16, paragraph 70, the Conference of the Parties encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

## 7. Scale of and trends in multilateral and bilateral climate finance

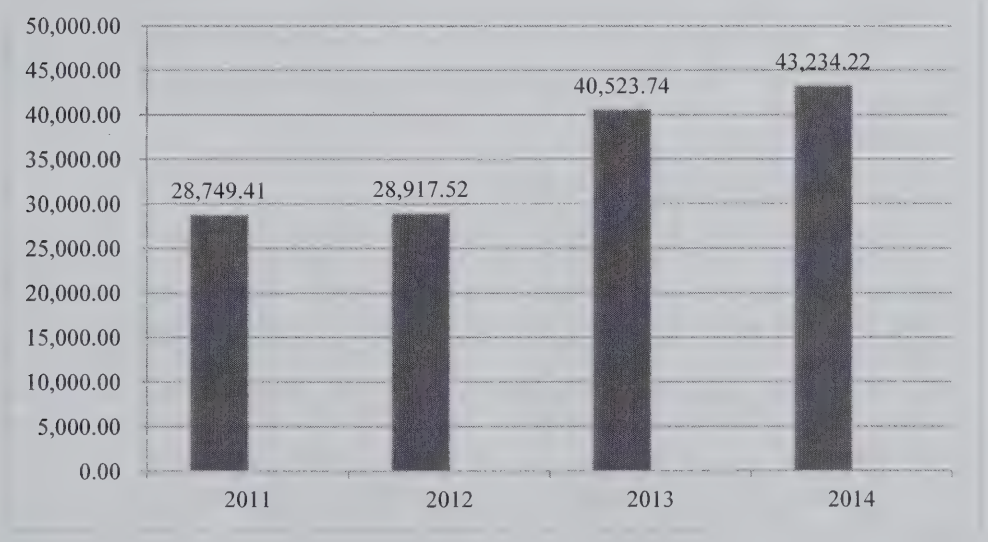
Trends in overall provision of public financial support

213. When comparing the BR1 summary information as contained in the last compilation and synthesis[34] to the information provided in the BR2s, and taking into account the reporting issues that were identified with regard to that report,[35] an overall increase in the financial contributions as reported by Annex II Parties can be identified, as shown in figure 19. Relevant data are provided in table 23 in the annex, which contains an overall summary of information provided by Annex II Parties in CTF table 7, and in table 24 in the annex, which contains this information on individual Annex II Parties. This information not only shows a clear and significant increase in the provision of financial support between the years 2011–2012 and 2013–2014, but also a slight increase within the reporting period from 2013 to 2014.

Figure 19

**Financial contributions reported in biennial report common tabular format table 7 by Annex II Parties for the years 2011–2014**

(Millions of United States dollars)




[34] Contained in the annex to document FCCC/SBI/2014/INF.20/Add.1.

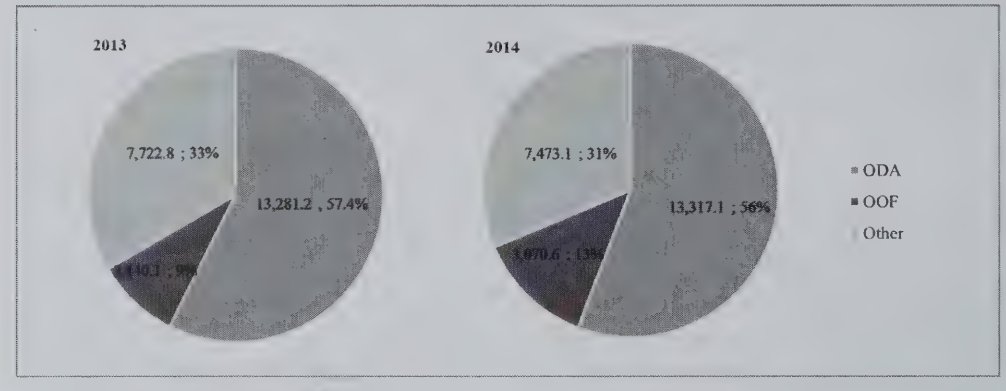
[35] As outlined in document FCCC/SBI/2014/INF.20/Add.1, paragraphs 269–271.

214. The larger portion of the total amount of support reported by Parties for the years 2013 and 2014 was identified as being climate specific, as shown in figure 20. Within this climate-specific support, by far the largest amount of funding was for supporting mitigation. While the amounts of support for adaptation and cross-cutting activities were similar in scale, there was a small decrease in the share of funding for adaptation within the reporting period. Overall, the larger portion of public financial support was provided through bilateral, regional and other channels.

Figure 20

**Provision of public financial support: summary information in 2013 and 2014 reported in common tabular format table 7 by Annex II Parties as at 4 May 2016**

(Millions of United States dollars)




215. Most of the trends identified in the BR1s continued to manifest themselves in the BR2s, including: the majority of funding being reported as climate specific; the majority of funding being directed towards mitigation activities; the increase of funding channelled through bilateral, regional and other channels; the predominant funding source being ODA; and Parties using mainly grants, followed by concessional loans and non-concessional loans, with equity being the minority instrument. The only noteworthy difference is on the status of funds. In the last compilation and synthesis report, it was highlighted that the greater part of funding reported in BR1s was marked as 'provided'. This same finding also applies to BR2s, but only with regard to contributions to multilateral channels. Parties marked most of their contributions to bilateral, regional and other channels as 'committed' in their BR2s (see figure 21).

Trends in contributions through multilateral channels

216. With regard to contributions through multilateral channels, as the data contained in table 24 in the annex show, the majority of funding reported on was identified as being core/general. Among the contributions through multilateral channels, the information provided by Parties shows that by far the largest amount of funding is provided through multilateral financial institutions, including regional development banks, followed by multilateral climate change funds, followed by specialized United Nations bodies. The smallest amount of funding was reported as flowing through other multilateral climate change funds.

217. On multilateral climate change funds, funding for the GEF remains the largest portion, with an increase of funding noticeable between 2013 and 2014, as shown in table 11. There was some decrease in funding for the LDCF and the SCCF from 2013 to 2014, but a slight increase of funding for the Adaptation Fund. Funding for the GCF has increased significantly, which is to be seen in the context of the initial resource mobilization of the GCF, launched in the year 2014.

218. With regard to multilateral financial institutions, including regional development banks, the largest portion of funding was provided to the World Bank, with a noticeable increase within the reporting period. The second-largest amount of funding was channelled through category other; however, this marked a clear decrease within the reporting period. Funding for regional development banks has increased within the reporting period, with the African Development Bank having received by far the largest amount of funding, followed by the Asian Development Bank and the Inter-American Development Bank. Funding for the International Finance Corporation has also increased within the reporting period.

Table 11
**Financial contributions through multilateral channels**
(Millions of United States dollars)

| | *2013* | | *2014* | |
|---|---|---|---|---|
| | *Core/general* | *Climate specific* | *Core/general* | *Climate specific* |
| **Total contributions through multilateral channels** | 12 051.74 | 2 273.93 | 13 707.17 | 2 741.75 |
| **Multilateral climate change funds** | 643.82 | 1 328.51 | 683.27 | 1 498.39 |
| 1. Global Environment Facility | 539.92 | 174.00 | 573.16 | 206.86 |
| 2. Least Developed Countries Fund | 47.93 | 231.82 | 12.71 | 94.31 |
| 3. Special Climate Change Fund | 6.42 | 55.84 | 7.59 | 29.09 |
| 4. Adaptation Fund | 10.79 | 69.86 | 6.63 | 74.82 |
| 5. Green Climate Fund | 0.00 | 1.81 | 18.51 | 68.43 |
| 6. UNFCCC Trust Fund for Supplementary Activities | 3.53 | 5.75 | 2.62 | 3.88 |
| 7. Other multilateral climate change funds | 35.24 | 789.43 | 62.03 | 1 021.00 |
| **Multilateral financial institutions, including regional development banks** | 10 171.23 | 666.46 | 11 344.74 | 868.87 |
| 1. World Bank | 4 624.47 | 176.91 | 6 259.28 | 269.93 |
| 2. International Finance Corporation | 15.36 | 3.64 | 16.73 | 30.76 |
| 3. African Development Bank | 1 123.15 | 97.65 | 1 317.85 | 88.72 |
| 4. Asian Development Bank | 612.66 | 33.89 | 723.47 | 63.35 |
| 5. European Bank for Reconstruction and Development | 6.88 | 6.82 | 4.81 | 7.04 |
| 6. Inter-American Development Bank | 124.76 | 0.64 | 120.51 | 90.43 |
| 7. Other | 3 663.95 | 346.91 | 2 902.08 | 318.65 |
| **Specialized United Nations bodies** | 1 236.69 | 279.27 | 1 679.16 | 374.49 |
| 1. United Nations Development Programme | 927.38 | 51.77 | 989.04 | 55.66 |
| 2. United Nations Environment Programme | 75.11 | 102.66 | 73.18 | 89.91 |
| 3. Other | 234.20 | 124.84 | 616.93 | 228.92 |

219. When comparing with the information provided in the last compilation and synthesis, considering that this information was retrieved from the NC6s[36] (i.e. a reporting period of four years), the data provided in the BR2s suggest an increase of funding directed towards multilateral channels, including multilateral dedicated climate change funds, such as the GCF.

Trends in contributions through bilateral, regional and other channels

220. With regard to contributions through bilateral, regional and other channels for the reporting period, the data indicate that the significantly larger amount of funding was labelled as 'committed', as can be seen in figure 21. By far the largest funding source was identified as ODA, as shown in figure 22. In terms of financial instruments, the largest amount of funding was labelled as other, closely followed by grants, as can be seen in figure 23. The third largest amount of funding was labelled as concessional loans, and a significantly lower amount as non-concessional loans.

Figure 21

**Contributions through bilateral, regional and other channels in 2013 and 2014, by status**

(Millions of United States dollars)

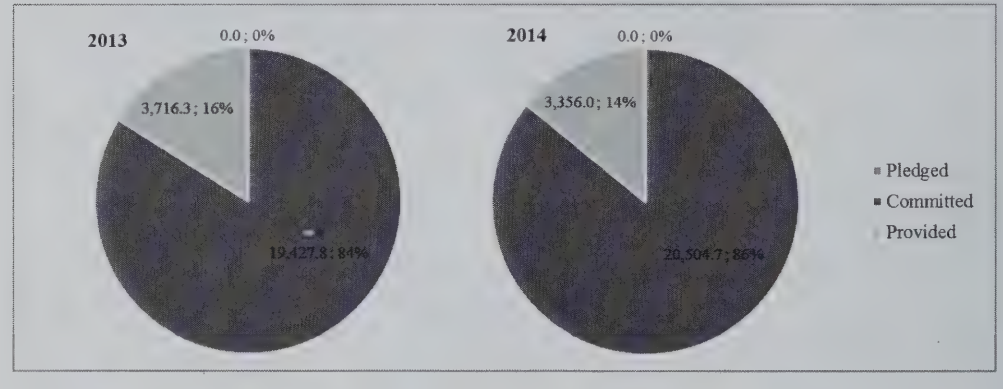
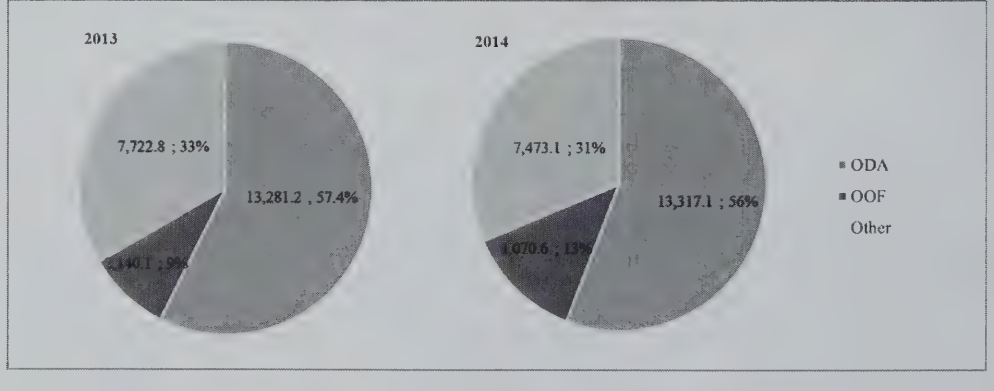



Figure 22

**Contributions through bilateral, regional and other channels in 2013 and 2014, by funding source**

(Millions of United States dollars)



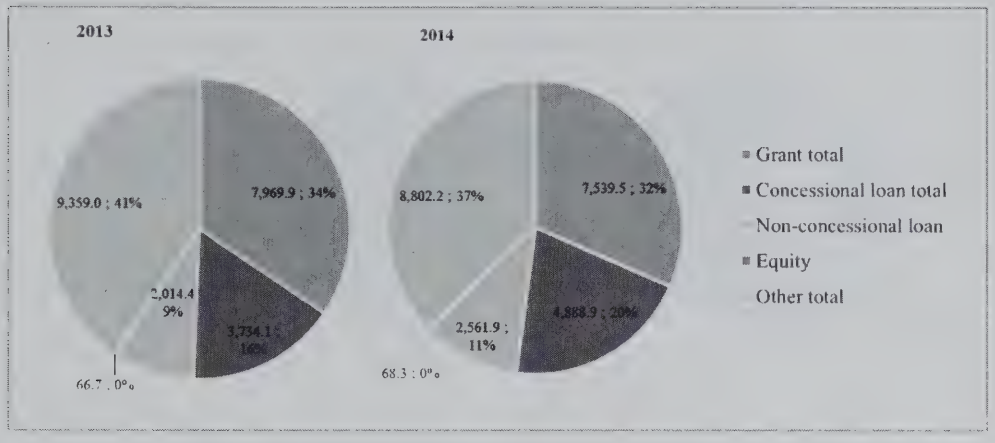

*Abbreviations*: ODA = official development assistance, OOF = other official flows.

[36] See tables 21–24 in document FCCC/SBI/2014/INF.20/Add.1.

Figure 23

**Contributions through bilateral, regional and other channels in 2013 and 2014, by financial instruments**

(Millions of United States dollars)




221. With regard to the type of support, as indicated in figure 24, the majority of funding was provided to mitigation, with a clear increase within the reporting period, followed by adaptation and cross-cutting, which slightly decreased within the reporting period. In terms of sectoral distribution, but bearing in mind that, in addition to the problematic methodological and reporting issues identified, not all Parties submitted such information by labelling single data entries in the CTF tables accordingly, the information provided suggests that the largest amount of funding was provided to the energy sector, followed by cross-cutting, transport, agriculture, water and sanitation, and forestry as shown in figure 25. However, a large portion of funding was reported as category other, and in cases where more than one sector was listed, such information was subsumed as multisectoral as it does not allow for a clear categorization of such funding. As a consequence, a large amount of funding reported on could not be categorized and included in the sectoral analysis.

Figure 24

**Contributions through bilateral, regional and other channels in 2013 and 2014, by type of support**

(Millions of United States dollars)

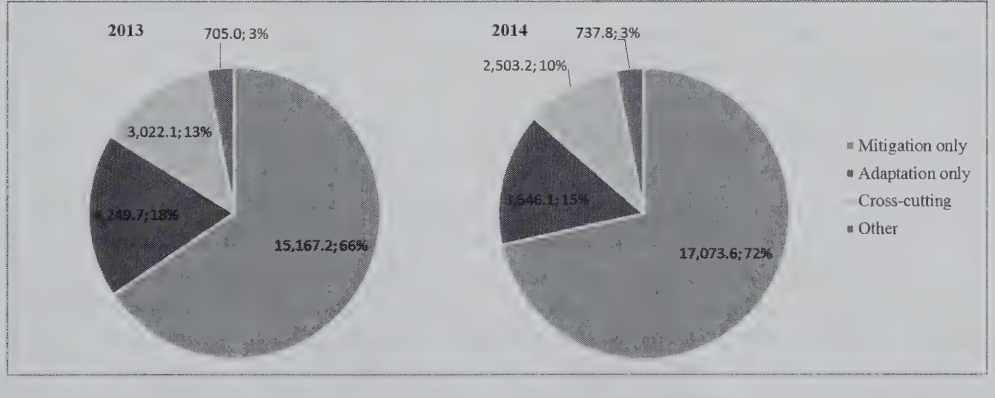
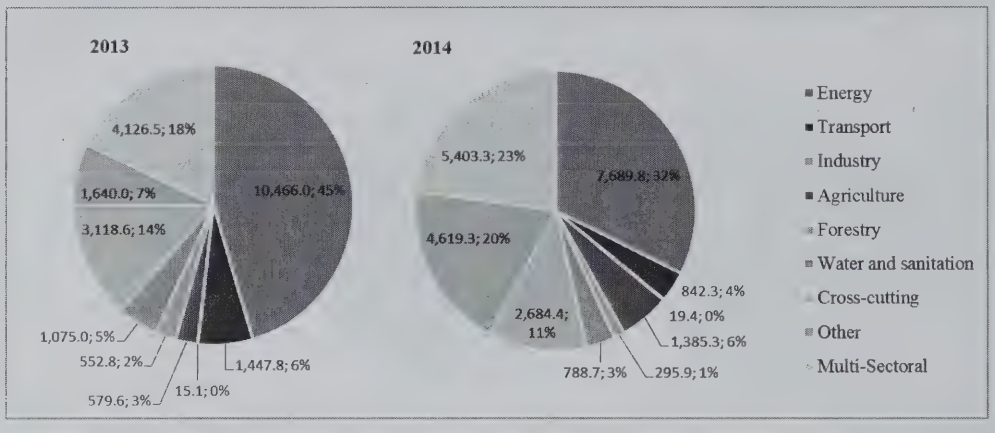


Figure 25
**Contributions through bilateral, regional and other channels in 2013 and 2014, by sector**
(Millions of United States dollars)




222. With regard to contributions through bilateral, regional and other channels, the findings as outlined in paragraph 220 above support the findings of the last compilation and synthesis report in terms of a continued increase in funding provided through such channels, an increase in funding directed towards mitigation, albeit the noticeable backdrop in funding directed towards energy within the reporting period, but also adaptation in spite of the noticeable backdrop in funding directed towards adaptation within the reporting period, and funding for forestry.[37]

## C. Transfer of technology

223. Most Annex II Parties provided information on practical steps taken to promote, facilitate and finance the transfer of, or access to, climate technologies and know-how to developing country Parties, thus giving effect to their commitments under Article 4, paragraph 5, of the Convention. Almost all of the Annex II Parties completed CTF table 8 and included a separate section on the transfer of technology in their BR2s. Most provided examples of concrete technology transfer projects and programmes.

224. Nearly half of the Annex II Parties highlighted issues regarding the reporting of support to non-Annex I Parties for technology development and transfer. This included issues such as overlap with reporting on climate finance and a lack of statistical markers for identifying technology transfer activities.

### 1. Climate technology needs

225. Annex II Parties reported that they had supported technology transfer activities for a variety of reasons. In addition to advancing the implementation of Article 4, paragraph 5, of the Convention, many noted the importance of enhancing the development and transfer of climate technologies to developing countries to address global challenges such as energy access, energy security, climate change and economic development. For example, the EU noted that it is vital that climate technologies are accessible in all parts of the world to keep the average global temperature rise to below 2 °C compared to pre-industrial levels. The

[37] As outlined in document FCCC/SBI/2014/INF.20/Add.1, paragraph 317, and table 26.

reported activities also correlated with the reported technology needs of developing countries and the technologies prioritized in requests to the Climate Technology Centre and Network; see boxes 12 and 13 for details.

Box 12
**Assessing the technology needs of Parties not included in Annex I to the Convention**

In 2013, the secretariat prepared a third synthesis report on technology needs identified by Parties not included in Annex I to the Convention.[a] That report highlighted the technology needs of 31 Parties not included in Annex I to the Convention (non-Annex I Parties) based on submitted technology needs assessment (TNA) reports. In comparing the sectors prioritized by these Parties with those of the supported technology activities reported by Parties included in Annex II to the Convention (Annex II Parties) in their second biennial reports (BR2s), for mitigation, there is a strong focus on the energy sector by both groups of Parties. For adaptation, the agriculture sector was a common focus of both groups. On the other hand, the water and sanitation sector was prioritized by many of the participating non-Annex I Parties in their TNAs, but made up a small percentage of the reported technology activities reported by Annex II Parties in their BR2s.

[a] See document FCCC/SBSTA/2013/INF.7.

Box 13
**Support for the Climate Technology Centre and Network**

The Climate Technology Centre and Network (CTCN) is the implementation arm of the UNFCCC Technology Mechanism, supporting developing country efforts to enhance the transfer and implementation of climate technologies. It has three core services: providing technical assistance at the request of developing countries; creating access to knowledge on climate technologies; and fostering collaboration among climate technology stakeholders. The United Nations Environment Programme, in collaboration with the United Nations Industrial Development Organization, hosts the CTCN with the support of 11 partner institutions. Some Parties included in Annex II to the Convention (Annex II Parties) referred to supporting the CTCN in their second biennial reports (BR2s).

As at mid-2016, the CTCN was responding to over 100 requests from developing countries on climate technology development and transfer issues. It may be noted that there is a correlation between the sectors prioritized by developing countries in their requests[a] and those of the supported technology activities reported by Annex II Parties in their BR2s. Similarly to technology needs assessments, for mitigation, there is a strong focus on the energy sector, and for adaptation, a common focus on the agriculture sector. Cross-cutting adaptation, water and sanitation, and climate observation/early warning sectors were also common focuses of developing country requests and of activities supported by Parties included in Annex I to the Convention in their BR2s.

[a] See <https://www.ctc-n.org/technical-assistance/request-visualizations>.

## 2. Trends

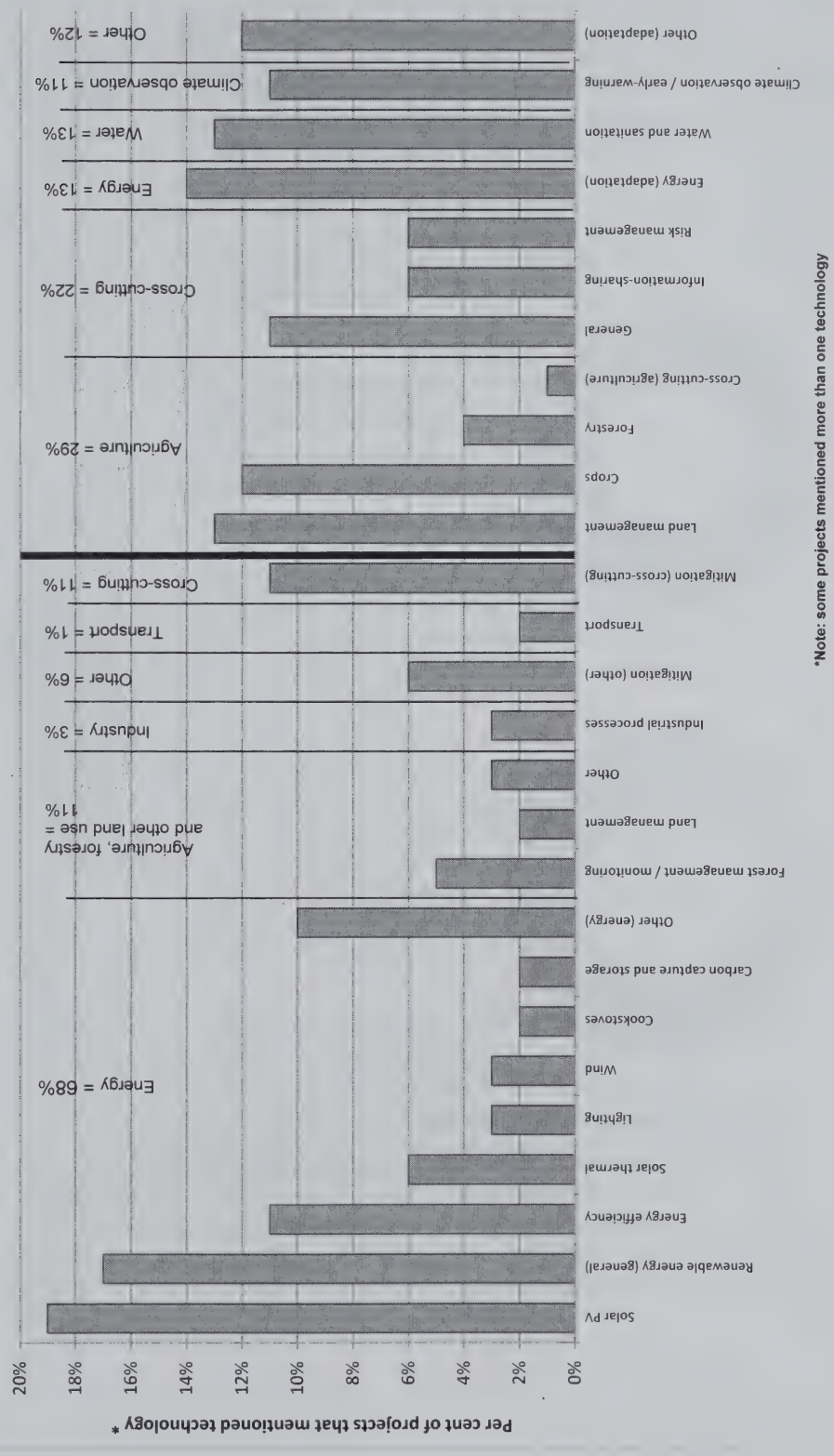
226. Most of the Annex II Parties included information on support provided to non-Annex I Parties for climate technology development and transfer. Of the Annex II Parties, 19 completed CTF table 8, providing information on support to non-Annex I Parties for almost 300 technology development and transfer activities. This marks a significant increase in the number of reported activities compared to the BR1s (approximately 170 activities). Additionally, half of the Annex II Parties noted that they had not reported all of

their technology activities in CTF table 8. Annex II Parties reported that the majority of the technology activities have been implemented, with 15 per cent reported as planned or ongoing.

227. Similar to the BR1s, the technology support that Annex II Parties provided in their BR2s continues to be focused primarily on supporting non-Annex I Parties to reduce GHGs, especially for the energy sector (see figure 26). In particular, many activities relate to renewable energy technologies and energy efficiency. The amount of solar photovoltaic projects and programmes has almost doubled since the BR1s (from being mentioned in 11 per cent of all projects in BR1s to 19 per cent of all projects in BR2s), while other energy technologies are similar to those of the previous reporting period. The amount of activities related to mitigation technologies in the agriculture sector has also risen, with a greater focus on forest and land management. Support for technology activities covers a full spectrum of mitigation technologies, ranging from high technology such as carbon capture and storage to relatively low technology such as efficient cook stoves.

228. Support for adaptation technology activities has grown significantly since the BR1s, with such activities now accounting for 40 per cent of all reported activities (see figure 26). This represents a fourfold increase in the number of reported adaptation technology projects and programmes compared to the BR1s. The most reported adaptation technologies were for the agriculture sector, such as those for land management and crops. These were often closely linked to mitigation technology activities, with some Parties noting that such activities had both mitigation and adaptation benefits. There was also a significant increase in cross-cutting adaptation technology activities, with many technologies supporting enhanced information sharing and risk management of adaptation effects in developing countries.

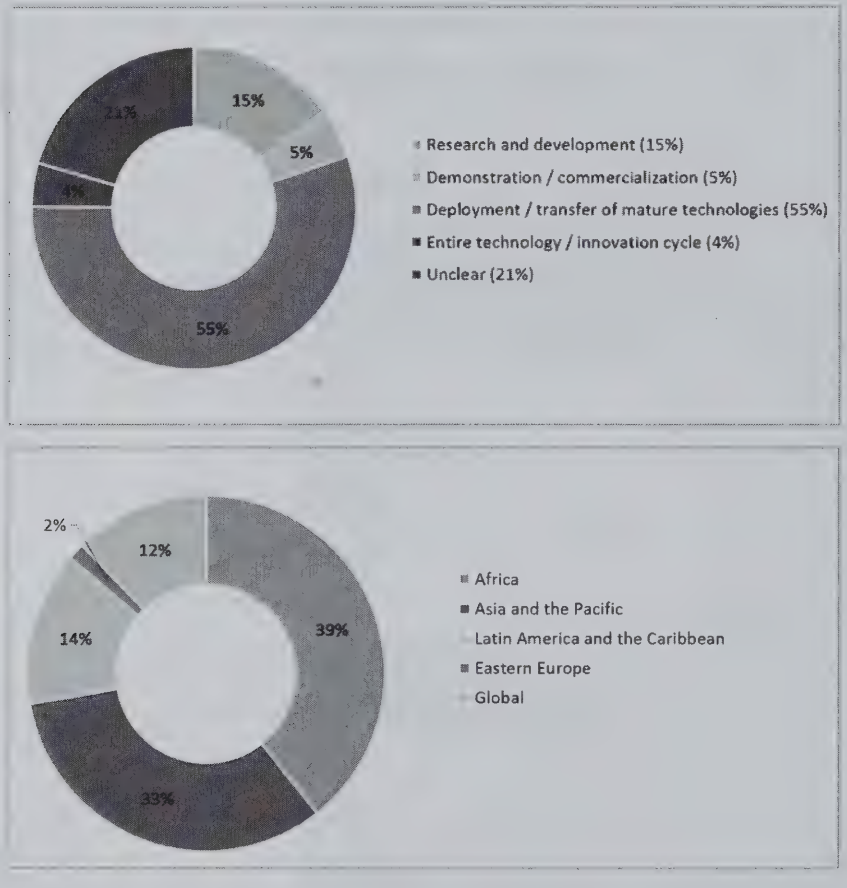
Figure 26
**Distribution by sector and technology of reported technology transfer activities as reported by Annex II Parties**




*Abbreviation:* PV = photovoltaics.

229. Similar to the BR1s, reported activities in the BR2s were predominantly related to the later stages of the technology cycle. As shown in figure 27, more than half of all reported technology activities were related to the transfer or deployment of mature climate technologies. While the majority of technology activities contained both hard and soft technology components, the trend continued from the BR1s that the transferring of hard technologies (for instance, solar photovoltaic panels or climate monitoring computer systems), often accompanied by training or capacity-building, was the most common. Approximately 20 per cent of activities focused primarily on transferring soft technologies, such as forest management strategies or training in using machinery.

Figure 27
**Distribution of technology transfer activities, by technology cycle stage and region**




### 3. Recipients of technology transfer support

230. By region, Africa now receives the greatest quantity of technology transfer activities reported by Annex II Parties (see figure 27), while for the BR1s, the Asia-Pacific region received the greatest quantity. Africa receives approximately 40 per cent of all activities, marking an almost twofold increase from the BR1s. Overall, more than 50 per cent of projects cover least developed countries and more than 40 per cent small island developing States.

### 4. Channels for implementation

231. Annex II Parties reported that almost all activities were funded completely by the public sector. A small number (10 per cent) of activities was reported to be funded completely by the private sector or a combination of public and private funding. In contrast, regarding the implementation of the activities, the public sector implemented just over half of the projects. Joint public–private initiatives implemented nearly 30 per cent of the reported activities. A few countries reported on projects implemented solely by the private sector.

232. Overall, Annex II Parties reported on three different levels of cooperation and partnerships to undertake the activities: bilateral cooperation, regional cooperation and multilateral cooperation.

233. Many Annex II Parties reported on supporting climate technology development and transfer activities through bilateral cooperation (see boxes 14 and 15 for examples). The activities were often part of ODA activities. For instance, Austria supported Egypt in installing and facilitating market penetration of high-quality solar thermal energy systems, and Japan assisted Myanmar in establishing a weather monitoring system.

Box 14
**Cooperation in preparing a drought forecasting tool**

The United States of America has supported Jamaica in developing a drought forecast tool aimed at providing farmers with information to help inform agriculture and water resource planning. The tool was developed by the Jamaican Meteorological Service and the Rural and Agricultural Development Agency of Jamaica, with support from the United States and technical support from Columbia University's International Research Institute for Climate and Society. The tool provided actionable information on the droughts of 2014 and 2015.

234. Some Annex II Parties presented examples of technology cooperation at the regional level, undertaken with the aim of addressing specific regional technology needs. For instance, the United Kingdom is providing financial support to the Green Mini-Grids Africa programme, which aims to increase energy access in Africa through expanding deployment of clean energy mini-grids. In the Asia-Pacific region, Finland is supporting small island developing States in installing weather information and forecast production systems. Similarly, in Latin America and the Caribbean, Spain is assisting Central American countries to establish an online virtual centre for early warning of weather hazards.

235. Many Annex II Parties also reported supporting technology transfer activities through multilateral cooperation. The majority of those activities focused on knowledge-sharing and information sharing and promoting good practices and lessons learned. For example, Australia established the International Savanna Fire Management Initiative. The initiative aims to share with developing countries the savannah fire management emissions abatement methodology and project experience developed by the Australian Government and tropical North Australia indigenous communities.

Box 15
**German–Indian research cooperation on solar energy**

Germany is providing support to strengthen German–Indian research cooperation and disseminate knowledge about solar thermal electricity generation and concentrator photovoltaics (CPV). As part of this support, testing and measurement equipment, calculation tools, a CPV system and a thermal energy storage facility will be installed in India for research purposes. Employees of an Indian power company will be trained in the new technologies and methods, in cooperation with two German research institutions. The cooperation initiative aims to strengthen applied research and technology transfer activities and enhance the practical application of research findings. It also aims to support the realization of the Indian energy sector's low-emissions development strategy and reduce greenhouse gas emissions. Furthermore, it aims to help to create highly skilled jobs in climate technology research in India.

## D. Provision of capacity-building support

### 1. Overview

236. In accordance with the UNFCCC reporting guidelines on BRs, Annex II Parties are required to provide information in their BR2s regarding capacity-building activities and the associated support provided to non-Annex I Parties. This was done specifically through CTF table 9, as well as through descriptions in the capacity-building chapter of the BR2s.

237. Although the UNFCCC reporting guidelines on BRs relating to capacity-building are not applicable to those Annex I Parties[38] under the Convention that are not included in Annex II to the Convention, four such Parties (Latvia, Monaco, Russian Federation and Slovakia) nevertheless reported on support to capacity-building activities in CTF table 9.

238. A few Parties indicated difficulties in reporting on capacity-building as a stand-alone activity (e.g. Switzerland), noting that capacity-building is often integrated into various types of projects and therefore difficult to isolate. In general, the information contained in the BR2s suggests that most of the projects implemented by ODA contain capacity-building components or approaches. Accordingly, the majority of Parties point out that projects included in CTF table 9 or in the dedicated sections on capacity-building in the BR2s represent a small selection of supported activities with a specific focus on capacity-building.

239. As a result, the identification of clear trends and patterns of capacity-building activities from the previous reporting period to the current one, is not straightforward. However, the information provided in the BR2s suggests that Annex II Parties have enhanced capacity-building activities at the individual, institutional and systemic levels.

### 2. Overview and trends in capacity-building projects reported in the first and second biennial reports

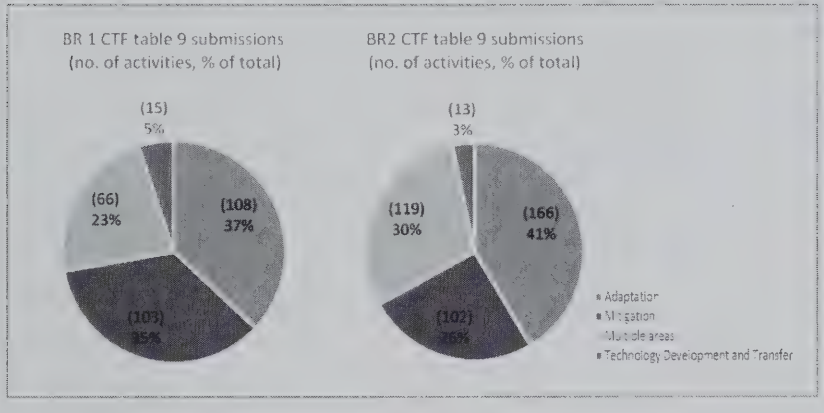
240. On the basis of the information contained in CTF table 9, 400 projects were reported in the BR2s, which was a notable increase from the 292 projects reported in the BR1s. Figure 28 illustrates the distribution of capacity-building projects reported in support of adaptation, mitigation, technology transfer and development, and multiple areas, for both BR1s and BR2s.

[38] Decision 2/CP.17, annex I, chapter VI.

241. The proportion of projects building capacity for adaptation and in multiple areas has increased, on account of a slight decrease in the proportion of reported projects that aim to build capacity for mitigation and for technology transfer. However, in absolute terms, the numbers of projects reported in adaptation and in multiple areas have remained stable and therefore there is no significant trend. Furthermore, funding allocation to individual projects has not been systematically provided, and so an assessment in terms of volume of support cannot be assessed through CTF table 9.

242. In terms of the regional distribution of projects, countries in Asia-Pacific, Latin America and the Caribbean and Africa have seen increases in the proportion of projects reported in CTF table 9 from the BR1s to the BR2s, while the proportion of multi-regional and Eastern European projects has decreased but remained stable in terms of number of projects. With regard to regional distribution, all regions saw an increased number of reported activities, with the exception of Eastern Europe. Also, a smaller percentage of multi-regional projects was reported.

Figure 28
**Capacity-building projects reported by focus area in the first and second biennial reports**

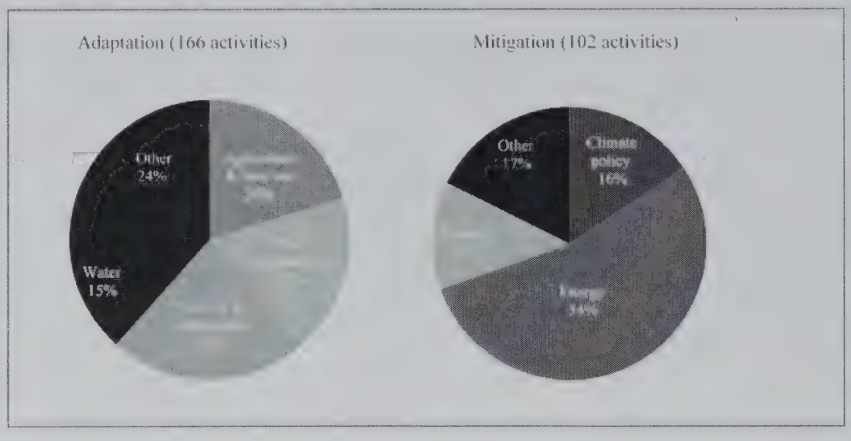



*Abbreviations*: BR1 = first biennial report, BR2 = second biennial report, CTF = common tabular format.

## 3. Capacity-building for adaptation and mitigation in second biennial reports

243. In the BR2s, a greater number of projects aims to build capacity for adaptation (166 projects) than for mitigation (102 projects), while some are in multiple areas (119 projects) and the fewest are related to technology (13 projects), in part because these may be captured under reporting for technology transfer. Figure 29 shows the distribution of the sectors within the focus areas of mitigation and adaptation.

Figure 29
**Focus of adaptation and mitigation activities in the second biennial reports**
(Percentage of total number of projects)




## 4. Capacity-building at the individual, institutional and systemic levels in second biennial reports

244. Parties also described the level of capacity-building targeted through projects, namely for individuals, institutions or systems. Capacity-building targeting the individual level refers to training, education, learning, awareness, outreach, campaigns, public participation, consultation or stakeholder engagement. Institutional-level capacity-building refers to the establishment or strengthening of a body, an entity, institution or committee, including support to a ministry, government or local authority, support to the civil society or the private sector, institutional strengthening or development. Finally, the systemic level refers to the development or adoption of national or local policies, strategies and action plans, adoption and enforcement of legislation, integration of climate change in national planning and budgeting for the creation of enabling environments.

245. The greatest number of projects is focused at building individual capacities, with almost half of the projects targeted at individuals, while nearly 30 per cent focused on strengthening the institutional level. The remaining 22 per cent of the reported capacity-building projects operated on a systemic level. There is an increasing call by Parties to orient capacity-building towards building long-term institutional capacities. Box 16 illustrates an example of a project that targets multiple levels.

Box 16
**Global Gender and Climate Alliance supported by Finland**
(Funded by the Government of Finland)

The Global Gender and Climate Alliance aims to strengthen the role of women and to mainstream the gender perspective in global climate policy. Funding from Finland has been allocated to support participation of women delegates in climate negotiations. During the second phase, from 2010 onwards, support was also targeted at the implementation of national adaptation programmes of action, including to promote gender objectives. During the third phase (2012–2014), the project emphasis focused on national level capacity-building. Finally, the project continued into the reporting period, and the fourth phase continues to promote women's leadership through, inter alia, providing support to the Women Delegates Fund, building the capacity of women to engage in climate process and strengthening the Global Gender and Climate Alliance secretariat. The total contribution for the four phases is EUR 8.9 million.

*Source*: <http://www.gender-climate.org/>.

## 5. Role of partnerships in enhancing the provision of capacity-building support

246. The information provided in the BR2s by Annex I Parties and by Annex II Parties suggests that bilateral cooperation was the primary channel used to implement projects. In addition to bilateral channels, almost all Parties that provided capacity-building support also provided support through multilateral channels or implemented projects in cooperation with international organizations. All Parties reported projects with a wide spectrum of shareholders, including actors from private organizations, at the regional, subregional and local levels. In addition, a few Parties reported the involvement of private co-funding. Box 17 describes a global programme applying multiple partnership models, including multi-donor funds, South–South partnerships and transfer of technical capacities, leveraging multiple sources of capacity.

Box 17
**Energy Sector Management Assistance Programme**

The Energy Sector Management Assistance Programme (ESMAP) is a global, multidonor technical assistance programme with a global scope that is administered by the World Bank Group and governed by a consultative group of donors that meets annually. ESMAP supports, among other things, geothermal energy capacity and resource risk mitigation through South–South cooperation (providing support for targeted research, design and preparation, capacity development and knowledge dissemination). Through a trilateral approach, the project will also build upon the experiences of countries with a track record in geothermal development (e.g. Indonesia, Kenya, Philippines and Turkey) that are open to share lessons with peer countries in the South. A transfer of specific capacities is also harnessed. For example, the Netherlands has specific expertise on improving the success rate of geothermal test drilling and mitigating geothermal resource risks, and is applying this to the programme, which has been creating conditions resulting in private sector partnerships in the energy sector.

*Source*: <http://www.esmap.org/>.

# Annex

## Supplementary data

Table 12

**Description of Annex I Parties' quantified economy-wide emission reduction targets reported in the second biennial reports common tabular format**

| Party | *Emission reduction target (change from base year level) (%)* | *Base year ($CO_2$, $CH_4$ and $N_2O$)* | *Base year (HFCs, PFCs and $SF_6$)* | *Base year ($NF_3$)* | *Gases ($CO_2$, $CH_4$, $N_2O$, HFCs, PFCs and $SF_6$)* | *Gases (other)* | *Global warming potential values* | *Sectors (energy transport, industrial processes, agriculture and waste)* | *Sectors (LULUCF included)* | *LULUCF accounting approach used* | *Market-based mechanisms under the Convention used* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 5 | 2000 | 2000 | 2000 | All | $NF_3$ | AR4 | All | Yes | Other[a] | Yes |
| Belarus | 5–10 | 1990 | 1990 | | All | | AR2 | All | No | | No |
| Canada | 17 | 2005 | 2005 | 2005 | All | $NF_3$ | AR4 | All | Yes | Other[b] | To be determined |
| European Union | 20 | 1990 | 1990 | | All | | AR4 | All[c] | No | | Yes |
| Iceland | 20 | 1990 | 1990 | | All | | AR4 | All | Yes | Activity | Yes |
| Japan | At least 3.8 | 2005 | 2005 | 2005 | All | $NF_3$ | AR4 | All | Yes | Activity | Yes |
| Kazakhstan | 15 | 1990 | 1995 | | All | | AR4 | All | No | | No |
| Liechtenstein | 20 | 1990 | 1990 | | All | | AR4 | All | Yes | Land | Yes |
| Monaco | 30 | 1990 | 1995 | 2000 | All | $NF_3$ | AR4 | All | No | | Yes |
| New Zealand | 5 | 1990 | 1990 | 1990 | All | $NF_3$ | AR4 | All | Yes | Activity | Yes |
| Norway | 30 | 1990 | 1990 | To be determined | All | $NF_3$ | AR4 | All | Yes | Activity | Yes |
| Russian Federation | 15–25 | 1990 | 1990 | 1990 | All | $NF_3$ | AR4 | All | No | | No |
| Switzerland | 20 | 1990 | 1990 | 1990 | All | $NF_3$ | AR4 | All | Yes | Activity | Yes |
| Turkey | – | – | – | – | – | – | – | – | – | – | – |
| Ukraine | 20 | 1990 | 1990 | To be determined | All | $NF_3$ | AR2 | All | No | | Yes |
| United States | In range of 17 in 2020 | 2005 | 2005 | 2005 | All | $NF_3$ | AR4 | All | Yes | Land | No |

*Abbreviations*: AR2 = Second Assessment Report of the Intergovernmental Panel on Climate Change, AR4 = Fourth Assessment Report of the Intergovernmental Panel on Climate Change, LULUCF = land use, land-use change and forestry.

[a] Based on the Kyoto Protocol LULUCF classification system: deforestation, afforestation, reforestation, forest management, cropland management, grazing land management and revegetation.

[b] As reported in the reports of the technical review of the second biennial report of Australia (FCCC/TRR.2/AUS) and New Zealand (FCCC/TRR.2/NZL) and in the reports of the technical review of the first biennial report of Norway (FCCC/TRR.1/NOR) and Ukraine (FCCC/TRR.1/UKR).

[c] The European Union's target includes aviation under the European Union Emissions Trading System and other (common reporting format table 7).

Table 13

**Greenhouse gas emission limits of the European Union's 28 member States for the sectors not covered by the European Union Emissions Trading System**

| *Party* | *Greenhouse gas emission limits by 2020 compared to 2005* | *Party* | *Greenhouse gas emission limits by 2020 compared to 2005* | *Party* | *Greenhouse gas emission limits by 2020 compared to 2005* |
|---|---|---|---|---|---|
| Austria | –16% | Germany | –14% | Netherlands | –16% |
| Belgium | –15% | Greece | –4% | Poland | 14% |
| Bulgaria | 20% | Hungary | 10% | Portugal | 1% |
| Croatia | 11% | Ireland | –20% | Romania | 19% |
| Cyprus | –5% | Italy | –13% | Slovakia | 13% |
| Czech Republic | 9% | Latvia | 17% | Slovenia | 4% |
| Denmark | –20% | Lithuania | 15% | Spain | –10% |
| Estonia | 11% | Luxembourg | –20% | Sweden | –17% |
| Finland | –16% | Malta | 5% | United Kingdom | –16% |
| France | –14% | | | | |

Table 14

**Total aggregate anthropogenic greenhouse gas emissions without emissions/removals from land use, land-use change and forestry, 1990, 2000, 2010 and 2014**

| | *Emissions (kt $CO_2$ eq)* | | | | *Change in emissions (%)* | | |
|---|---|---|---|---|---|---|---|
| *Party* | *1990* | *2000* | *2010* | *2014* | *1990–2014* | *1990–2000* | *2000–2014* |
| Australia | 418 623 | 483 446 | 533 917 | 534 090 | 24.8 | 15.5 | 8.1 |
| Austria | 78 845 | 80 429 | 84 946 | 82 627 | –3.2 | 2.0 | –5.1 |
| Belarus[a] | 133 457 | 77 960 | 91 184 | 91 672 | –31.1 | –41.6 | 17.9 |
| Belgium | 146 021 | 149 213 | 133 258 | 122 833 | –22.0 | 2.2 | –23.7 |
| Bulgaria[a, b] | 114 578 | 58 265 | 59 820 | 65 096 | –50.1 | –49.1 | –1.8 |
| Canada | 612 866 | 744 241 | 706 403 | 709 764 | 19.5 | 21.4 | –1.6 |
| Croatia[a] | 31 205 | 25 173 | 27 280 | 26 774 | –26.6 | –19.3 | –9.0 |
| Cyprus | 5 638 | 8 339 | 9 521 | 9 240 | 48.9 | 47.9 | 0.7 |
| Czech Republic[a] | 195 345 | 147 993 | 137 687 | 136 357 | –36.7 | –24.2 | –16.4 |
| Denmark | 70 246 | 70 131 | 62 944 | 57 740 | –27.7 | –0.2 | –27.6 |
| Estonia[a] | 39 965 | 17 062 | 19 912 | 20 485 | –47.3 | –57.3 | 23.4 |
| European Union (28) | 5 664 004 | 5 169 177 | 4 786 104 | 4 627 099 | –24.4 | –8.8 | –17.1 |
| Finland | 71 077 | 69 855 | 75 835 | 67 947 | –17.0 | –1.7 | –15.5 |
| France | 549 065 | 556 461 | 518 940 | 491 554 | –15.4 | 1.3 | –16.5 |
| Germany | 1 246 101 | 1 041 064 | 939 372 | 920 151 | –27.8 | –16.5 | –13.5 |
| Greece | 104 827 | 127 688 | 118 733 | 115 682 | –3.3 | 21.8 | –20.6 |
| Hungary[a, b] | 109 636 | 73 557 | 65 524 | 63 808 | –47.8 | –32.9 | –22.2 |
| Iceland | 3 634 | 3 963 | 4 730 | 4 520 | 26.5 | 9.1 | 16.0 |
| Ireland | 56 088 | 69 251 | 62 235 | 58 130 | 3.7 | 23.5 | –16.0 |
| Italy | 521 921 | 554 479 | 508 424 | 494 790 | –19.8 | 6.2 | –24.5 |
| Japan | 1 270 743 | 1 386 714 | 1 304 903 | 1 354 616 | 7.3 | 9.1 | –1.6 |
| Latvia[a] | 26 256 | 10 434 | 12 362 | 11 602 | –56.8 | –60.3 | 8.8 |
| Liechtenstein | 229 | 248 | 231 | 218 | –10.4 | 8.2 | –17.3 |
| Lithuania[a] | 47 209 | 18 739 | 20 163 | 20 647 | –59.5 | –60.3 | 2.1 |
| Luxembourg | 12 871 | 9 743 | 12 221 | 12 091 | –16.3 | –24.3 | 10.6 |
| Malta | 2 000 | 2 626 | 3 099 | 3 212 | 49.1 | 31.3 | 13.6 |
| Monaco | 99 | 110 | 90 | 87 | –8.2 | 10.3 | –16.8 |
| Netherlands | 221 516 | 219 916 | 213 523 | 199 801 | –15.7 | –0.7 | –15.0 |
| New Zealand | 65 828 | 76 385 | 78 942 | 78 942 | 23.2 | 16.0 | 6.2 |
| Norway | 51 913 | 54 869 | 55 272 | 54 280 | 2.4 | 5.7 | –3.1 |
| Poland[a, b] | 579 869 | 392 276 | 403 599 | 403 271 | –34.5 | –32.4 | –3.1 |
| Portugal | 60 487 | 83 798 | 70 232 | 68 697 | 6.5 | 38.5 | –23.2 |
| Romania[a, b] | 301 085 | 140 511 | 116 998 | 121 691 | –63.5 | –53.3 | –21.9 |
| Russian Federation[a] | 3 940 191 | 2 432 751 | 2 772 489 | 2 840 634 | –28.6 | –38.3 | 15.6 |
| Slovakia[a] | 74 504 | 49 798 | 46 543 | 45 664 | –45.4 | –33.2 | –18.4 |
| Slovenia[a, b] | 20 394 | 19 126 | 19 619 | 19 626 | –18.7 | –6.2 | –13.3 |
| Spain | 285 934 | 385 119 | 360 800 | 360 353 | 15.0 | 34.7 | –14.6 |
| Sweden | 71 917 | 68 869 | 64 997 | 60 987 | –24.4 | –4.2 | –21.0 |
| Switzerland | 53 314 | 52 314 | 54 363 | 50 285 | –8.8 | –1.9 | –7.1 |
| Turkey[c] | 207 773 | 296 811 | 395 283 | 415 869 | 125.0 | 42.9 | 57.5 |
| Ukraine[a] | 945 616 | 412 807 | 400 607 | 420 284 | –62.7 | –56.3 | –14.5 |
| United Kingdom | 799 838 | 717 281 | 613 863 | 565 688 | –34.1 | –10.3 | –26.5 |
| United States | 6 580 834 | 7 431 235 | 7 159 307 | 7 037 694 | 6.9 | 12.9 | –5.3 |
| Number of Parties showing a decrease in emissions by more than 1 per cent | | | | | 30 | 21 | 31 |
| Number of Parties showing a change in emissions within 1 per cent | | | | | 0 | 2 | 1 |
| Number of Parties showing an increase in emissions by more than 1 per cent | | | | | 13 | 20 | 11 |

[a] A Party undergoing the process of transition to a market economy.

[b] Data for the base year under the Convention are for 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

[c] Decision 26/CP.7 invited Parties to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

Table 15

**Total aggregate anthropogenic greenhouse gas emissions with emissions/removals from land use, land-use change and forestry, 1990, 2000, 2010 and 2014**

| | *Emissions (kt $CO_2$ eq)* | | | | *Change in emissions (%)* | | |
|---|---|---|---|---|---|---|---|
| *Party* | *1990* | *2000* | *2010* | *2014* | *1990–2014* | *1990–2000* | *2000–2014* |
| Australia | 549 045 | 544 123 | 556 536 | 524 999 | –4.4 | –0.9 | –3.5 |
| Austria | 65 992 | 63 512 | 78 421 | 70 774 | 7.2 | –3.8 | 11.4 |
| Belarus[a] | 109 074 | 51 714 | 66 137 | 76 264 | –30.1 | –52.6 | 47.5 |
| Belgium | 143 679 | 147 474 | 129 283 | 109 847 | –23.5 | 2.6 | –25.5 |
| Bulgaria[a, b] | 99 303 | 48 134 | 50 570 | 45 934 | –53.7 | –51.5 | –4.6 |
| Canada | 525 677 | 662 625 | 761 036 | 804 212 | 53.0 | 26.1 | 21.4 |
| Croatia[a] | 24 557 | 17 038 | 20 122 | 16 384 | –33.3 | –30.6 | –3.8 |
| Cyprus | 5 025 | 7 780 | 8 881 | 7 743 | 54.1 | 54.8 | –0.5 |
| Czech Republic[a] | 188 877 | 139 205 | 130 510 | 115 858 | –38.7 | –26.3 | –16.8 |
| Denmark | 76 492 | 74 892 | 64 459 | 52 367 | –31.5 | –2.1 | –30.1 |
| Estonia[a] | 31 839 | 18 017 | 14 572 | 20 482 | –35.7 | –43.4 | 13.7 |
| European Union (28) | 5 420 288 | 4 866 587 | 4 480 685 | 3 995 352 | –26.4 | –10.3 | –18.0 |
| Finland | 55 049 | 45 521 | 48 687 | 38 249 | –30.5 | –17.3 | –16.0 |
| France | 518 484 | 523 702 | 480 170 | 413 772 | –20.2 | 1.0 | –21.0 |
| Germany | 1 214 822 | 1 003 112 | 923 049 | 885 226 | –27.1 | –17.4 | –11.8 |
| Greece | 102 548 | 125 803 | 115 473 | 98 167 | –4.3 | 22.7 | –22.0 |
| Hungary[a, b] | 107 915 | 73 341 | 61 813 | 52 632 | –51.2 | –32.0 | –28.2 |
| Iceland | 15 129 | 15 512 | 16 587 | 16 466 | 8.8 | 2.5 | 6.1 |
| Ireland | 62 310 | 75 658 | 67 496 | 63 411 | 1.8 | 21.4 | –16.2 |
| Italy | 515 851 | 535 489 | 474 065 | 391 972 | –24.0 | 3.8 | –26.8 |
| Japan | 1 211 448 | 1 299 902 | 1 235 779 | 1 302 399 | 7.5 | 7.3 | 0.2 |
| Latvia[a] | 17 835 | 3 738 | 13 936 | 15 574 | –12.7 | –79.0 | 316.6 |
| Liechtenstein | 234 | 256 | 246 | 217 | –7.3 | 9.7 | –15.5 |
| Lithuania[a] | 43 639 | 9 791 | 9 303 | 11 030 | –74.7 | –77.6 | 12.7 |
| Luxembourg | 12 923 | 9 041 | 12 068 | 10 310 | –20.2 | –30.0 | 14.0 |
| Malta | 1 998 | 2 623 | 3 096 | 2 980 | 49.2 | 31.3 | 13.6 |
| Monaco | 99 | 110 | 90 | 91 | –8.2 | 10.3 | –16.8 |
| Netherlands | 227 597 | 226 121 | 219 530 | 193 213 | –15.1 | –0.6 | –14.6 |
| New Zealand | 36 901 | 45 947 | 49 676 | 56 690 | 53.6 | 24.5 | 23.4 |
| Norway | 41 442 | 31 297 | 29 401 | 27 715 | –33.1 | –24.5 | –11.4 |
| Poland[a, b] | 563 876 | 358 861 | 370 991 | 347 534 | –38.4 | –36.4 | –3.2 |
| Portugal | 62 235 | 77 794 | 58 827 | 54 096 | –13.1 | 25.0 | –30.5 |
| Romania[a, b] | 284 759 | 117 692 | 98 501 | 91 501 | –67.9 | –58.7 | –22.3 |
| Russian Federation[a] | 4 105 091 | 2 086 058 | 2 224 828 | 2 299 275 | –44.0 | –49.2 | 10.2 |
| Slovakia[a] | 65 513 | 40 080 | 40 531 | 34 536 | –47.3 | –38.8 | –13.8 |
| Slovenia[a, b] | 15 770 | 11 142 | 12 396 | 9 676 | –38.6 | –29.3 | –13.2 |
| Spain | 260 568 | 350 456 | 327 451 | 297 426 | 14.1 | 34.5 | –15.1 |
| Sweden | 34 945 | 30 733 | 20 119 | 9 316 | –73.3 | –12.1 | –69.7 |
| Switzerland | 52 430 | 57 223 | 52 266 | 47 656 | –9.1 | 9.1 | –16.7 |
| Turkey[c] | 177 544 | 260 596 | 348 089 | 407 670 | 129.6 | 46.8 | 56.4 |
| Ukraine[a] | 899 589 | 371 767 | 369 138 | 340 125 | –62.2 | –58.7 | –8.5 |
| United Kingdom | 800 089 | 714 359 | 606 053 | 518 237 | –35.2 | –10.7 | –27.5 |
| United States | 5 835 798 | 6 740 675 | 6 384 322 | 6 266 570 | 7.4 | 15.5 | –7.0 |
| Number of Parties showing a decrease in emissions by more than 1 per cent | | | | | 32 | 23 | 29 |
| Number of Parties showing a change in emissions within 1 per cent | | | | | 0 | 2 | 2 |
| Number of Parties showing an increase in emissions by more than 1 per cent | | | | | 11 | 18 | 12 |

[a] A Party undergoing the process of transition to a market economy.

[b] Data for the base year under the Convention are for 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

[c] Decision 26/CP.7 invited Parties to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

Figure 30

**Heat chart of policies and measures by type of policy instrument and by sector affected**

Occurrence (number of reported policies and measures)[a]

| | Energy | Transport | Industry/ industrial processes | Agriculture | Forestry/ LULUCF | Waste management/ waste | Other | Cross-cutting | Total |
|---|---|---|---|---|---|---|---|---|---|
| Regulatory | 286 | 158 | 111 | 75 | 48 | 95 | 91 | 59 | 923 |
| Economic | 289 | 139 | 64 | 79 | 65 | 47 | 53 | 54 | 639 |
| Voluntary Agreements | 48 | 32 | 29 | 12 | 14 | 11 | 6 | 10 | **126** |
| Information | 90 | 59 | 35 | 28 | 16 | 14 | 16 | 35 | **229** |
| Other | 60 | 59 | 15 | 27 | 16 | 29 | 10 | 25 | **207** |
| Fiscal | 77 | 77 | 20 | 9 | 9 | 16 | 13 | 24 | **178** |
| Education | 28 | 25 | 11 | 17 | 8 | 6 | 3 | 12 | **95** |
| Research | 22 | 13 | 9 | 20 | 11 | 4 | 1 | 7 | **53** |
| **Total** | **630** | **382** | **202** | **164** | **119** | **144** | **150** | **174** | **1,630** |

Impact (estimated annual emission reductions in Mt $CO_2$ eq in 2020)[a]

| | Energy | Transport | Industry/ industrial processes | Agriculture | Forestry/ LULUCF | Waste management/ waste | Other | Cross-cutting | Total |
|---|---|---|---|---|---|---|---|---|---|
| Regulatory | 771 | 529 | 514 | 8 | 6 | 297 | 91 | 26 | 2,057 |
| Economic | 1,224 | 69 | 260 | 118 | 4 | 35 | 30 | 82 | 1,483 |
| Voluntary Agreements | 444 | 53 | 100 | 33 | 0 | 19 | 1 | 2 | **639** |
| Information | 114 | 25 | 439 | 73 | 4 | 22 | 8 | 10 | **625** |
| Other | 351 | 15 | 38 | 214 | 47 | 17 | 64 | 14 | **483** |
| Fiscal | 152 | 36 | 48 | 3 | - | 10 | 13 | 7 | **197** |
| Education | 33 | 5 | 35 | 3 | 2 | 0 | 29 | 7 | **83** |
| Research | 54 | 6 | 1 | 4 | 3 | - | - | 1 | **60** |
| **Total** | **2,305** | **644** | **808** | **341** | **54** | **334** | **190** | **120** | **4,058** |

| high | medium | low |
|---|---|---|

*Note*: These values include the estimated impacts of the policies and measures in all Annex I Parties, including European Union (EU) member States, but excluding the EU. The values exclude the impacts of the EU Emissions Trading System (EU ETS) as reported by EU member States, but include the EU-wide impacts of the EU ETS, estimated by the UNFCCC to be 494 Mt $CO_2$ eq, classified as an economic policy instrument. The values do not include the 2020 mitigation effects of the Clean Power Plan of the United States of America, which is reported as a regulatory policy and measure in the energy sector and becomes operational in 2022.

*Abbreviation*: LULUCF = land use, land-use change and forestry.

[a] For the reasons discussed in box 1, these charts include some double counting of number of reported policies and measures and estimated emission reductions.

Table 16
**Reported mitigation actions of Annex I Parties**

| *Party* | *Total number of mitigation actions reported* | *Number of mitigation actions reported as implemented/adopted/planned* | *Number of mitigation actions reported with quantified effects* | *Estimated emission reduction by 2020 due to mitigation actions reported with quantified effects (kt $CO_2$ eq)* |
|---|---|---|---|---|
| Australia | 26 | 22/3/1 | 1 | 17 900 |
| Belarus | 18 | 0/18/0 | 1 | 1 250 |
| Canada | 127 | 109/4/14 | 45 | 119 972 |
| European Union | 76 | 65/8/3 | 29 | 1 692 450 |
| European Union 28 member States[a] | 1 169 | 927/119/123 | 561 | 947 261 |
| Iceland | 23 | 23/0/0 | 3 | 215 |
| Japan | 40 | 40/0/0 | 9 | 67 474 |
| Kazakhstan | 32 | 1/25/6 | 13 | 247 365 |
| Liechtenstein | 5 | 5/0/0 | 5 | 64 |
| Monaco | 32 | 19/3/10 | 6 | 21 |
| New Zealand | 23 | 23/0/0 | 9 | 5 329 |
| Norway | 20 | 17/0/3 | 3 | 320 |
| Russian Federation | 7 | 4/2/1 | 1 | 125 625 |
| Switzerland | 30 | 29/0/1 | 14 | 14 170 |
| Turkey | 0 | 0/0/0 | 0 | 0 |
| Ukraine | – | –/–/– | – | – |
| United States | 78 | 73/4/1 | 42 | 2 060 023 |
| **Total[b]** | **1 706** | **1 357/186/163** | **742** | **5 299 439** |

[a] While the European Union reported on common European Union policies and measures (PaMs), European Union member States reported also national PaMs and made national estimates of the effect of their PaMs (see table 17).

[b] These values do not include the mitigation actions and their estimated effects reported by the European Union, in order to avoid the double counting of the mitigation actions and estimated effects reported by its 28 member States.

Table 17
**Reported mitigation actions of European Union member States**

| *Party* | *Total number of mitigation actions reported* | *Number of mitigation actions reported as implemented/adopted/planned* | *Number of mitigation actions reported with quantified effects* | *Estimated emission reduction by 2020 due to mitigation actions reported with quantified effects (kt $CO_2$ eq)* |
|---|---|---|---|---|
| Austria | 24 | 14/9/1 | 11 | 17 010 |
| Belgium | 113 | 110/0/3 | 25 | 26 349 |
| Bulgaria | 33 | 22/11/0 | 33 | 43 329 |
| Croatia | 47 | 39/2/6 | 5 | 5 036 |
| Cyprus | 9 | 7/1/1 | 8 | 1 426 |
| Czech Republic | 74 | 72/0/2 | 61 | 26 312 |
| Denmark | 64 | 56/8/0 | 10 | 48 129 |
| Estonia | 60 | 46/0/14 | 40 | 3 842 |
| Finland | 59 | 52/2/5 | 25 | 36 740 |
| France | 28 | 23/4/1 | 18 | 89 998 |
| Germany | 41 | 41/0/0 | 22 | 238 761 |
| Greece | 17 | 17/0/0 | 16 | 30 370 |
| Hungary | 21 | 17/1/3 | 1 | 959 |
| Ireland | 42 | 26/2/14 | 41 | 13 333 |
| Italy | 37 | 24/0/13 | 29 | 58 968 |
| Latvia | 57 | 38/3/16 | 20 | 1 517 |
| Lithuania | 9 | 9/0/0 | 9 | 7 962 |
| Luxembourg | 20 | 14/1/5 | 5 | 837 |
| Malta | 33 | 31/0/2 | 30 | 1 794 |
| Netherlands | 18 | 18/0/0 | 16 | 31 440 |
| Poland | 24 | 24/0/0 | 12 | 104 410 |
| Portugal | 29 | 23/4/2 | 3 | 8 519 |
| Romania | 73 | 45/3/25 | 11 | 7 990 |
| Slovakia | 42 | 20/22/0 | 29 | 4 125 |
| Slovenia | 32 | 31/1/0 | 17 | 3 610 |
| Spain | 65 | 21/38/6 | 29 | 9 031 |
| Sweden | 38 | 38/0/0 | 4 | 21 650 |
| United Kingdom | 60 | 49/7/4 | 31 | 103 816 |
| **Total** | **1 169** | **927/119/123** | **561** | **947 261** |

Table 18
**Types, characteristics and examples of main policies and measures**

| *Policy type* | *Characteristics and examples* |
|---|---|
| **Economic and fiscal instruments** | |
| Carbon and energy taxes | Carbon taxes – one of the two measures aimed at creating a uniform carbon price – are typically applied to fuels and electricity, seeking to raise their prices in a manner consistent with their inherent emission factors. Other energy taxes (e.g. ad valorem and excise taxes), while greatly influencing energy use and $CO_2$ emissions, have historically been used to raise revenue and enhance oil security, and most Parties continue to tax energy for those purposes |
| Emissions trading schemes | Emissions trading schemes – the other measure aimed at creating a uniform carbon price – are used to create a price for carbon indirectly, by requiring emitters to submit a tradable certificate (or allowance) for each tonne of their $CO_2$ emissions, while limiting the quantity of available certificates via a quota or cap |
| Other market instruments (other quotas and certificates) and reforms | Other quota and certificate systems are used to add flexibility of implementation (and reduce costs) in meeting other climate-related regulations and targets. The certificates are denominated not in tonnes of direct emissions but rather in amounts of: electricity production from renewable energy sources (RES) (green certificates); electricity production from combined heat and power (blue certificates); energy savings (white certificates); and landfill waste reduction (landfill allowance certificates). Electricity and gas market reforms, including energy pricing subsidy reforms, are used to increase the openness, efficiency and competitiveness of the energy supply and energy efficiency service sector (e.g. energy-performance contracting) |
| Other fiscal and economic incentives (fees, rebates, subsidies and project funding) | Fiscal and economic incentives – used to promote or penalize certain purchases, investments or behaviour through financial means – can take many forms, including: subsidies for energy-efficient product purchases or home renovations; project financing assistance; guaranteed minimum feed-in tariffs for electricity production from RES; differentiated purchase fees and rebates on automobiles based on fuel economy; road use charges; landfill usage charges; and grants, loans and guarantees for emission mitigation projects |
| **Regulations (rules, standards and permitting requirements)** | Regulations (rules, standards and permitting requirements) are used to directly shape the market by reducing the role played by less-efficient, more carbon-intensive products (e.g. making it illegal to sell poorly performing equipment) or by increasing the role of climate-friendly operating practices (e.g. requiring industrial plants to undergo energy audits or using best available technologies). Regulations take many forms, including: appliance and equipment efficiency standards; building codes; landfill operating standards; manufacturing and power plant permitting criteria; and power plant fuel share obligations (e.g. a minimum share of RES) |
| **Voluntary/negotiated agreements** | Voluntary sectoral commitments encompass a variety of industry sector–government arrangements that range from covenants with binding targets and severe repercussions for non-compliance to agreements with aspirational targets and mild consequences for failure to attain them. Voluntary enterprise partnerships are a diverse group of programmes aimed at individual companies, with various mixes of information, education, promotion, advice, decision aids, inventories, assessments, audits, strategies, action plans, aspirational challenges and targets, monitoring systems, benchmarks, performance indicators, public reporting, public recognition, public–private cooperative action and sometimes financing |
| **Framework targets with measurement, reporting and verification (MRV) of emissions** | Framework targets establish legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals for emission levels (carbon budgets), technology shares, fuel shares and efficiency, followed up by MRV procedures to ensure compliance. Framework targets are intermediate measures used by Parties to focus the direction and stringency of their operational policies and measures (PaMs) or to partially shift responsibilities for mitigation to lower levels of government, which must then implement their own operational PaMs (e.g. economic incentives and market instruments) to achieve the targets |
| **Information, education and awareness (labels, auditing, metering, advice and demonstration) programmes** | Information, education and awareness programmes – intended to improve the availability and accuracy of information about the emission and energy characteristics of appliances and equipment – include labels for household appliances and entertainment devices, office equipment and buildings, and audits for buildings (in the residential, commercial and public sectors), best-practice manuals, motor ratings and plant audits (in the industrial sector) and |

| *Policy type* | *Characteristics and examples* |
|---|---|
| | labels for automobiles and tyres (in the transport sector). Models and demonstrations – seeking to increase confidence (i.e. reduce perceived risk) in new technological methods for reducing emissions – are used mostly in the areas of commercial buildings, energy supply (power generation and transport fuel) and agriculture |
| **Research and development** | Research and development policies – intended to provide a long-term signal to the industry to enhance its ability to deliver necessary emission reductions in the energy supply, energy end-use and non-energy fields, while improving Parties' competitive position in the potential markets for the new technologies – include direct funding and contributions to joint international research efforts |
| **Other** | |
| Public facilities, vehicles, infrastructure and waste management | Planning, auditing, management, procurement and maintenance policies are used by governments to reduce emissions from the public facilities, offices, vehicles, equipment, infrastructure and waste management services under their jurisdiction |
| Urban and regional development and land use | Urban and regional development and land-use policies seek to gain efficiencies and emission reductions through tighter integration among the components of large systems and networks |

Table 19
**Overview of greenhouse gas emission projection scenarios reported by Annex I Parties in their second biennial reports**

| | *Scenarios* | | | | *GHG projections* | |
|---|---|---|---|---|---|---|
| *Party* | *WM* | *WAM* | *NM* | *Projection period* | *By gas* | *By sector* |
| Australia | Yes | No | No | To 2020 | All six gases | All sectors |
| Austria | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Belarus | Yes | Yes | No | To 2030 | NA | LULUCF not available |
| Belgium | Yes | No | No | To 2030 | All six gases | All sectors |
| Bulgaria | Yes | No | No | To 2030 | All six gases | All sectors |
| Canada | Yes | No | No | To 2030 | All six gases | LULUCF not available |
| Croatia | Yes | Yes | Yes | To 2030 | All six gases | All sectors |
| Cyprus | Yes | Yes | Yes | To 2030 | All six gases | LULUCF not available |
| Czech Republic | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Denmark | Yes | No | No | To 2030 | All six gases | All sectors |
| Estonia | Yes | Yes | No | To 2030 | All six gases | All sectors |
| European Union | Yes | No | No | To 2030 | All six gases | All sectors |
| Finland | Yes | Yes | No | To 2030 | All six gases | All sectors |
| France | Yes | No | No | To 2030 | All six gases | All sectors |
| Germany | Yes | No | No | To 2030 | All six gases | LULUCF not available |
| Greece | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Hungary | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Iceland | Yes | No | No | To 2030 | All six gases | LULUCF not available |
| Ireland | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Italy | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Japan | Yes | No | No | To 2030 | All six gases | All sectors |
| Latvia | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Liechtenstein | Yes | No | No | To 2030 | All six gases | All sectors |
| Lithuania | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Luxembourg | Yes | No | No | To 2030 | All six gases | All sectors |
| Malta | Yes | No | No | To 2030 | All six gases | LULUCF not available |
| Monaco | Yes | No | No | To 2030 | NA | All sectors |
| Netherlands | Yes | Yes | No | To 2030 | All six gases | LULUCF not available |
| New Zealand | Yes | No | Yes | To 2030 | All six gases | All sectors |
| Norway | Yes | No | No | To 2030 | All six gases | All sectors |
| Poland | Yes | No | No | To 2030 | All six gases | All sectors |
| Portugal | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Romania | Yes | Yes | Yes | To 2030 | All six gases | All sectors |
| Russian Federation | Yes | Yes | Yes | To 2030 | All six gases | Only energy available |
| Slovakia | Yes | Yes | Yes | To 2030 | All six gases | All sectors |
| Slovenia | Yes | No | No | To 2030 | All six gases | LULUCF not available |

| | *Scenarios* | | | | *GHG projections* | |
|---|---|---|---|---|---|---|
| *Party* | *WM* | *WAM* | *NM* | *Projection period* | *By gas* | *By sector* |
| Spain | Yes | Yes | No | To 2030 | All six gases | All sectors |
| Sweden | Yes | No | No | To 2030 | All six gases | All sectors |
| Switzerland | Yes | Yes | Yes | To 2030 | All six gases | All sectors |
| Turkey | Yes | No | Yes | To 2030 | All six gases | Transport included in energy |
| Ukraine[a] | Yes | Yes | Yes | To 2030 | All six gases | All sectors |
| United Kingdom | Yes | No | No | To 2030 | All six gases | Transport included in energy |
| United States | Yes | No | No | To 2030 | All six gases | All sectors |

*Note*: The information for Ukraine is from its first biennial report, as Ukraine has not yet submitted its second biennial report.

*Abbreviations*: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not available, NM = 'without measures', WM = 'with measures', WAM = 'with additional measures'.

Table 20
**Summary of key assumptions used for greenhouse gas projections**

| *Parameter* | *2011–2020* | *2020–2030* |
|---|---|---|
| *Average gross domestic product growth rate (per year)* | | |
| Below 2% | **EIT Parties:** Belarus, Bulgaria, Croatia and Slovenia | **EIT Parties:** Bulgaria and Croatia |
| | **Non-EIT Parties:** Australia, Austria, Canada, Cyprus, France, Italy, Japan, Norway, Portugal and Switzerland | **Non-EIT Parties:** Austria, Canada, Denmark, France, Germany, Greece, Italy, Japan, New Zealand, Spain, Sweden and Switzerland |
| 2–4% | **EIT Parties:** Czech Republic, Hungary, Latvia, Russian Federation and Slovakia | **EIT Parties:** Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia and Slovenia |
| | **Non-EIT Parties:** Iceland, Ireland, Luxembourg, Malta, New Zealand, Sweden, Turkey, United Kingdom and United States | **Non-EIT Parties:** Cyprus, Iceland, Ireland, Luxembourg, Malta, Norway, Portugal, United Kingdom and United States |
| Above 4% | **EIT Parties:** NA | **EIT Parties:** Belarus |
| | **Non-EIT Parties:** Netherlands | **Non-EIT Parties:** Netherlands and Turkey |
| NA | **EIT Parties:** Estonia, Poland, Romania and Ukraine | **EIT Parties:** Ukraine |
| | **Non-EIT Parties:** Belgium, Denmark, Finland, Germany, Greece, Liechtenstein, Monaco and Spain | **Non-EIT Parties:** Australia, Belgium, Finland, Liechtenstein and Monaco |
| *Average population growth (per year)* | | |
| Below 0 (negative) | **EIT Parties:** Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Romania and Slovenia | **EIT Parties:** Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia and Slovenia |
| | **Non-EIT Parties:** Japan | **Non-EIT Parties:** Germany, Japan and Spain |
| 0–3% | **EIT Parties:** Czech Republic, Russian Federation and Slovakia | **EIT Parties:** NA |
| | **Non-EIT Parties:** Australia, Austria, Belgium, Canada, Cyprus, Finland, France, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, Turkey, United Kingdom and United States | **Non-EIT Parties:** Austria, Belgium, Canada, Cyprus, Finland, France, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, Turkey, United Kingdom and United States |
| NA | **EIT Parties:** Belarus, Poland and Ukraine | **EIT Parties:** Belarus and Ukraine |
| | **Non-EIT Parties:** Denmark, Germany, Greece, Malta and Spain | **Non-EIT Parties:** Australia, Denmark and Malta |
| *International oil price (per barrel)* | | |
| Below USD 75 | **EIT Parties:** Croatia and Romania | **EIT Parties:** Romania and Slovenia |
| | **Non-EIT Parties:** Canada, France, Netherlands and Portugal | **Non-EIT Parties:** Norway |

| *Parameter* | *2011–2020* | *2020–2030* |
|---|---|---|
| Above USD 75 | **EIT Parties:** Bulgaria and Czech Republic<br>**Non-EIT Parties:** Austria, Iceland, Ireland, Italy, Norway, New Zealand, Switzerland and United Kingdom | **EIT Parties:** Bulgaria, Croatia, Czech Republic and Slovakia<br>**Non-EIT Parties:** Austria, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, New Zealand, Portugal, Switzerland and United Kingdom |
| NA | **EIT Parties:** Belarus, Estonia, Hungary, Latvia, Lithuania, Poland, Russian Federation, Slovakia, Slovenia and Ukraine<br>**Non-EIT Parties:** Australia, Belgium, Cyprus, Denmark, Finland, Germany, Greece, Japan, Liechtenstein, Luxembourg, Malta, Monaco, Spain, Sweden, Turkey and United States | **EIT Parties:** Belarus, Estonia, Hungary, Latvia, Lithuania, Poland, Russian Federation and Ukraine<br>**Non-EIT Parties:** Australia, Belgium, Cyprus, Finland, Japan, Liechtenstein, Luxembourg, Malta, Monaco, Spain, Sweden, Turkey and United States |

*Abbreviations:* EIT Parties = Parties with economies in transition, NA = not available, non-EIT Parties = Parties that do not have economies in transition.

Table 21

**Projected changes in total aggregate greenhouse gas emissions without emissions/removals from land use, land-use change and forestry of individual Annex I Parties**

| | | *'With measures' scenario* | | | | *'With additional measures' scenario* | | | | *'Without measures' scenario* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Actual emissions (kt $CO_2$ eq)* | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | |
| *Party* | *1990* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* |
| Australia | 418 623 | 571 624 | 571 624 | 36.5 | 36.5 | – | – | – | – | – | – | – | – |
| Austria | 78 845 | 79 067 | 75 957 | 0.3 | –3.7 | 73 293 | 66 619 | –7.0 | –15.5 | – | – | – | – |
| Belarus | 133 457 | 88 120 | 104 028 | –34.0 | –22.1 | 86 870 | 100 278 | –34.9 | –24.9 | – | – | – | – |
| Belgium | 146 021 | 117 894 | 124 773 | –19.3 | –14.6 | – | – | – | – | – | – | – | – |
| Bulgaria | 114 578 | 60 179 | 57 171 | –47.5 | –50.1 | – | – | – | – | – | – | – | – |
| Canada | 612 866 | 767 500 | 813 900 | 25.2 | 32.8 | – | – | – | – | – | – | – | – |
| Croatia | 31 205 | 26 271 | 29 687 | –15.8 | –4.9 | 23 719 | 24 469 | –24.0 | –21.6 | 33 365 | 38 675 | 6.9 | 23.9 |
| Cyprus | 5 638 | 6 908 | 7 233 | 22.5 | 28.3 | 6 047 | 5 800 | 7.3 | 2.9 | 8 208 | 7 894 | 45.6 | 40.0 |
| Czech Republic | 195 345 | 119 558 | 104 661 | –38.8 | –46.4 | 114 030 | 98 941 | –41.6 | –49.4 | – | – | – | – |
| Denmark | 70 246 | 43 623 | 44 081 | –37.9 | –37.2 | – | – | – | – | – | – | – | – |
| European Union | 39 965 | 21 903 | 17 715 | –45.2 | –55.7 | 21 210 | 16 048 | –46.9 | –59.8 | – | – | – | – |
| Estonia | 5 657 154 | 4 228 314 | 4 034 442 | –25.3 | –28.7 | – | – | – | – | – | – | – | – |
| Finland | 71 077 | 63 787 | 49 777 | –10.3 | –30.0 | 63 608 | 49 258 | –10.5 | –30.7 | – | – | – | – |
| France | 549 065 | 467 530 | 466 740 | –14.8 | –15.0 | – | – | – | – | – | – | – | – |
| Germany | 1 246 101 | 833 234 | 707 285 | –33.1 | –43.2 | – | – | – | – | – | – | – | – |
| Greece | 104 827 | 104 852 | 100 184 | 0.0 | –4.4 | 103 876 | 94 899 | –0.9 | –9.5 | – | – | – | – |
| Hungary | 109 636 | 59 924 | 59 370 | –45.3 | –45.8 | 57 922 | 54 589 | –47.2 | –50.2 | – | – | – | – |
| Iceland | 3 634 | 4 338 | 4 314 | 19.4 | 18.7 | – | – | – | – | – | – | – | – |
| Ireland | 56 088 | 60 794 | 64 097 | 8.4 | 14.3 | 54 940 | 54 263 | –2.0 | –3.3 | – | – | – | – |
| Italy | 521 921 | 440 448 | 449 497 | –15.6 | –13.9 | 424 348 | 404 483 | –18.7 | –22.5 | – | – | – | – |
| Japan | 1 270 743 | 1 399 465 | 1 079 000 | 10.1 | –15.1 | – | – | – | – | – | – | – | – |
| Latvia | 26 256 | 12 516 | 13 989 | –52.3 | –46.7 | 11 084 | 11 689 | –57.8 | –55.5 | – | – | – | – |
| Liechtenstein | 229 | 194 | 177 | –15.3 | –22.7 | – | – | – | – | – | – | – | – |
| Lithuania | 47 209 | 22 368 | 24 383 | –52.6 | –48.4 | 21 452 | 20 875 | –54.6 | –55.8 | – | – | – | – |

| | | *'With measures' scenario* | | | | *'With additional measures' scenario* | | | | *'Without measures' scenario* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Actual emissions (kt $CO_2$ eq)* | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | |
| *Party* | *1990* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* |
| Luxembourg | 12 871 | 10 608 | 11 261 | –17.6 | –12.5 | – | – | – | – | – | – | – | – |
| Malta | 2 000 | 1 865 | 1 879 | –6.7 | –6.1 | – | – | – | – | – | – | – | – |
| Monaco | 99 | 72 | 70 | –27.7 | –29.8 | – | – | – | – | – | – | – | – |
| Netherlands | 221 516 | 180 857 | 174 537 | –18.4 | –21.2 | 178 357 | 173 037 | –19.5 | –21.9 | – | – | – | – |
| New Zealand | 65 828 | 82 937 | 86 028 | 26.0 | 30.7 | – | – | – | – | 84 120 | 87 516 | 27.8 | 32.9 |
| Norway | 51 913 | 54 853 | 52 489 | 5.7 | 1.1 | – | – | – | – | – | – | – | – |
| Poland | 579 869 | 386 408 | 358 849 | –33.4 | –38.1 | – | – | – | – | – | – | – | – |
| Portugal | 60 487 | 63 049 | 55 847 | 4.2 | –7.7 | 62 911 | 52 056 | 4.0 | –13.9 | – | – | – | – |
| Romania | 301 085 | 126 850 | 146 758 | –57.9 | –51.3 | 124 040 | 141 476 | –58.8 | –53.0 | 133 774 | 156 214 | –55.6 | –48.1 |
| Russian Federation | 3 940 191 | 2 400 000 | 2 590 000 | –39.1 | –34.3 | 2 250 000 | 2 260 000 | –42.9 | –42.6 | 2 860 000 | 3 490 000 | –27.4 | –11.4 |
| Slovakia | 74 504 | 44 133 | 46 219 | –40.8 | –38.0 | 42 854 | 41 753 | –42.5 | –44.0 | 45 800 | 48 112 | –38.5 | –35.4 |
| Slovenia | 20 394 | 18 198 | 17 002 | –10.8 | –16.6 | – | – | – | – | – | – | – | – |
| Spain | 285 934 | 319 170 | 356 714 | 11.6 | 24.8 | 344 590 | 381 312 | 20.5 | 33.4 | – | – | – | – |
| Sweden | 71 917 | 55 345 | 51 687 | –23.0 | –28.1 | – | – | – | – | – | – | – | – |
| Switzerland | 53 314 | 47 110 | 40 027 | –11.6 | –24.9 | 43 402 | 31 647 | –18.6 | –40.6 | 51 249 | 48 363 | –3.9 | –9.3 |
| Turkey | 207 773 | 669 253 | 998 698 | 222.1 | 380.7 | – | – | – | – | 713 094 | 1 213 479 | 243.2 | 484.0 |
| Ukraine | 945 616 | 459 104 | 541 981 | –51.4 | –42.7 | 451 777 | 520 462 | –52.2 | –45.0 | 509 641 | 800 097 | –46.1 | –15.4 |
| United Kingdom | 799 838 | 458 205 | 422 729 | –42.7 | –47.1 | – | – | – | – | – | – | – | – |
| United States | 6 580 834 | 6 614 000 | 6 364 000 | 0.5 | –3.3 | – | – | – | – | – | – | – | – |

Table 22

**Projected changes in total aggregate greenhouse gas emissions with emissions/removals from land use, land-use change and forestry of individual Annex I Parties**

| | | *'With measures' scenario* | | | | *'With additional measures' scenario* | | | | *'Without measures' scenario* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Actual emissions (kt $CO_2$ eq)* | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | | *Projected emissions (kt $CO_2$ eq)* | | *Change compared to the 1990 level (%)* | |
| *Party* | *1990* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* |
| Australia | 549 045 | 592 791 | – | 8.0 | – | – | – | – | – | – | – | – | – |
| Austria | 65 992 | – | – | – | – | – | – | – | – | – | – | – | – |
| Belarus | 109 074 | 88 120 | 104 028 | –19.2 | –4.6 | 86 870 | 100 278 | –20.4 | –8.1 | – | – | – | – |
| Belgium | 143 679 | 117 117 | 125 688 | –18.5 | –12.5 | – | – | – | – | – | – | – | – |
| Bulgaria | 99 303 | 49 123 | 43 858 | –50.5 | –55.8 | – | – | – | – | – | – | – | – |
| Canada | 525 677 | 608 300 | 673 400 | 15.7 | 28.1 | – | – | – | – | – | – | – | – |
| Croatia | 24 557 | 17 973 | 21 260 | –26.8 | –13.4 | – | – | – | – | – | – | – | – |
| Cyprus | 5 025 | – | – | – | – | – | – | – | – | – | – | – | – |
| Czech Republic | 188 877 | 117 645 | 101 730 | –37.7 | –46.1 | 111 659 | 95 616 | –40.9 | –49.4 | – | – | – | – |
| Denmark | 76 492 | 47 589 | 47 760 | –37.8 | –37.6 | – | – | – | – | – | – | – | – |
| European Union | 31 839 | 19 690 | 16 059 | –38.2 | –49.6 | 18 997 | 14 392 | –40.3 | –54.8 | – | – | – | – |
| Estonia | 5 401 960 | – | – | – | – | – | – | – | – | – | – | – | – |
| Finland | 55 049 | 53 687 | 43 677 | –2.5 | –20.7 | 53 508 | 43 158 | –2.8 | –21.6 | – | – | – | – |
| France | 518 484 | 405 930 | 392 300 | –21.7 | –24.3 | – | – | – | – | – | – | – | – |
| Germany | 1 214 822 | – | – | – | – | – | – | – | – | – | – | – | – |
| Greece | 102 548 | 101 876 | 97 570 | –0.7 | –4.9 | 100 900 | 92 285 | –1.6 | –10.0 | – | – | – | – |
| Hungary | 107 915 | 57 114 | 56 582 | –47.1 | –47.6 | 54 566 | 51 097 | –49.4 | –52.7 | – | – | – | – |
| Iceland | 15 129 | 254 | 259 | –98.3 | –98.3 | – | – | – | – | – | – | – | – |
| Ireland | 62 310 | 63 059 | 69 466 | 1.2 | 11.5 | 57 205 | 59 633 | –8.2 | –4.3 | – | – | – | – |
| Italy | 515 851 | 414 995 | 409 148 | –19.6 | –20.7 | 398 894 | 364 134 | –22.7 | –29.4 | – | – | – | – |
| Japan | 1 211 448 | 1 363 161 | 1 054 000 | 12.5 | –13.0 | – | – | – | – | – | – | – | – |
| Latvia | 17 835 | 17 422 | 21 123 | –2.3 | 18.4 | 15 990 | 18 823 | –10.3 | 5.5 | – | – | – | – |
| Liechtenstein | 234 | 291 | 257 | 24.7 | 10.2 | – | – | – | – | – | – | – | – |
| Lithuania | 43 639 | 12 463 | 14 472 | –71.4 | –66.8 | 10 407 | 7 535 | –76.1 | –82.7 | – | – | – | – |

| | | *'With measures' scenario* | | | | *'With additional measures' scenario* | | | | *'Without measures' scenario* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Actual emissions ($kt CO_2 eq$)* | *Projected emissions ($kt CO_2 eq$)* | | *Change compared to the 1990 level (%)* | | *Projected emissions ($kt CO_2 eq$)* | | *Change compared to the 1990 level (%)* | | *Projected emissions ($kt CO_2 eq$)* | | *Change compared to the 1990 level (%)* | |
| *Party* | *1990* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* | *2020* | *2030* |
| Luxembourg | 12 923 | – | – | – | – | – | – | – | – | – | – | – | – |
| Malta | 1 998 | 1 862 | 1 876 | –6.8 | –6.1 | – | – | – | – | – | – | – | – |
| Monaco | 99 | 72 | 70 | –27.7 | –29.8 | – | – | – | – | – | – | – | – |
| Netherlands | 227 597 | – | – | – | – | 2 257 | 1 137 | –99.0 | –99.5 | – | – | – | – |
| New Zealand | 36 901 | 58 722 | 74 594 | 59.1 | 102.1 | – | – | – | – | 64 050 | 79 695 | 263.4 | 279.7 |
| Norway | 41 442 | 31 387 | 31 218 | –24.3 | –24.7 | – | – | – | – | – | – | – | – |
| Poland | 563 876 | 364 091 | 345 885 | –35.4 | –38.7 | – | – | – | – | – | – | – | – |
| Portugal | 62 235 | 55 482 | 47 531 | –10.9 | –23.6 | 55 344 | 43 740 | –11.1 | –29.7 | – | – | – | – |
| Romania | 284 759 | 108 887 | 129 332 | –61.8 | –54.6 | 107 036 | 130 594 | –62.4 | –54.1 | 112 650 | 136 027 | –58.3 | –47.6 |
| Russian Federation | 4 105 091 | – | – | – | – | 10 000 | 10 000 | –99.8 | –99.8 | 20 000 | 20 000 | –99.4 | –99.4 |
| Slovakia | 65 513 | 35 107 | 36 057 | –46.4 | –45.0 | 33 337 | 31 198 | –49.1 | –52.4 | 36 774 | 37 950 | –43.9 | –42.1 |
| Slovenia | 15 770 | – | – | – | – | – | – | – | – | – | – | – | – |
| Spain | 260 568 | 352 724 | 389 448 | 35.4 | 49.5 | 311 035 | 348 579 | 19.4 | 33.8 | – | – | – | – |
| Sweden | 34 945 | 29 781 | 26 669 | –14.8 | –23.7 | – | – | – | – | – | – | – | – |
| Switzerland | 52 430 | 46 554 | 38 998 | –11.2 | –25.6 | 44 022 | 33 183 | –16.0 | –36.7 | 50 561 | 47 174 | –3.6 | –10.0 |
| Turkey | 177 544 | 599 217 | 928 987 | 237.5 | 423.2 | – | – | – | – | 672 901 | 1 174 781 | 279.0 | 561.7 |
| Ukraine | 899 589 | 429 331 | 506 781 | –52.3 | –43.7 | 422 004 | 485 260 | –53.1 | –46.1 | 509 641 | 800 097 | –41.5 | –8.1 |
| United Kingdom | 800 089 | 454 603 | 423 028 | –43.2 | –47.1 | – | – | – | – | – | – | – | – |
| United States | 5 835 798 | 5 451 000 | 5 274 000 | –6.6 | –9.6 | – | – | – | – | – | – | – | – |

Table 23

**Provision of public financial support: summary information for 2013 and 2014 reported in common tabular format table 7 by Annex II Parties, as at 4 May 2016**

(Millions of United States dollars)

| | *2013* | | | | | *2014* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Core/general* | *Climate specific* | | | | *Core/general* | *Climate specific* | | | |
| *Channel* | | *Mitigation* | *Adaptation* | *Cross-cutting* | *Other* | | *Mitigation* | *Adaptation* | *Cross-cutting* | *Other* |
| Total contributions through multilateral channels | 12 051.74 | 583.45 | 432.83 | 1 201.60 | 56.04 | 13 707.17 | 450.02 | 289.79 | 1 879.52 | 122.41 |
| Multilateral climate change funds | 643.82 | 294.18 | 408.65 | 609.74 | 15.94 | 683.27 | 292.76 | 276.38 | 929.26 | 0.00 |
| Other multilateral climate change funds | 35.24 | 281.36 | 97.38 | 410.69 | 0.00 | 62.03 | 278.61 | 76.23 | 666.17 | 0.00 |
| Multilateral financial institutions, including regional development banks | 10 171.23 | 193.06 | 14.10 | 418.88 | 40.11 | 11 344.74 | 63.18 | 10.83 | 686.11 | 108.75 |
| Specialized United Nations bodies | 1 236.69 | 96.20 | 10.08 | 172.99 | 0.00 | 1 679.16 | 94.09 | 2.59 | 264.16 | 13.66 |
| Total contributions through bilateral, regional and other channels | 3 053.97 | 15 167.25 | 4 249.74 | 3 022.08 | 705.04 | 2 924.57 | 17 073.62 | 3 546.09 | 2 503.18 | 737.83 |
| **Total** | **15 105.71** | **15 750.70** | **4 682.58** | **4 223.68** | **761.09** | **16 631.74** | **17 523.65** | **3 835.89** | **4 382.71** | **860.24** |

Table 24

**Financial contributions in 2013 and 2014, reported in common tabular format table 7 submitted by Annex II Parties, as at 4 May 2016**

| | *Contribution to total (2013)* | | | | | *Contribution to total (2014)* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Party* | *Total contribution in 2013 (USD million)* | *Multilateral climate change funds (%)* | *Multilateral financial institutions, including regional development banks (%)* | *Specialized United Nations bodies (%)* | *Bilateral, regional and other channels (%)* | *Total contribution in 2014 (USD million)* | *Multilateral climate change funds (%)* | *Multilateral financial institutions, including regional development banks (%)* | *Specialized United Nations bodies (%)* | *Bilateral, regional and other channels (%)* |
| Australia | 546.79 | 9.0 | 52.9 | 1.7 | 36.3 | 467.68 | 6.1 | 73.0 | 5.1 | 15.9 |
| Austria | 188.78 | 5.5 | 28.6 | 0.8 | 65.1 | 187.39 | | 28.6 | 0.8 | 70.6 |
| Belgium | 589.28 | 10.7 | 69.2 | 10.2 | 9.9 | 627.05 | 15.6 | 64.7 | 11.3 | 8.5 |
| Canada | 231.97 | 14.1 | 58.2 | 2.2 | 25.4 | 213.99 | 13.1 | 52.8 | 2.3 | 31.8 |
| Denmark | 488.75 | 6.7 | 34.6 | 22.6 | 36.1 | 495.13 | 9.5 | 23.5 | 24.6 | 42.4 |
| European Union | 3 998.33 | | | | 100.0 | 3 680.26 | | | | 100.0 |
| Finland | 636.84 | 6.9 | 64.3 | 22.1 | 6.6 | 828.07 | 9.0 | 36.6 | 47.3 | 7.1 |
| France | 3 028.19 | 2.0 | | | 98.0 | 3 716.57 | 1.6 | | | 98.4 |
| Germany | 2 652.98 | 8.7 | 7.8 | 0.2 | 83.4 | 3 960.92 | 6.5 | 29.7 | 0.8 | 63.0 |
| Greece | 1.23 | 21.1 | | 75.9 | 3.0 | 0.67 | 7.0 | | 93.0 | |
| Iceland | 15.06 | 1.8 | 21.3 | 71.1 | 5.8 | 19.54 | 2.3 | 22.9 | 55.7 | 19.1 |
| Ireland | 92.16 | 2.4 | 48.7 | 0.5 | 48.3 | 144.95 | 2.3 | 29.4 | 39.1 | 29.3 |
| Italy | 752.84 | 4.3 | 85.0 | 2.5 | 8.2 | 714.00 | 2.5 | 86.6 | 6.1 | 4.7 |
| Japan | 10 409.20 | 1.3 | 18.4 | 2.7 | 77.6 | 10 770.58 | 1.6 | 19.3 | 2.9 | 76.2 |
| Luxembourg | 39.10 | 3.5 | 5.9 | 11.4 | 79.3 | 55.57 | 14.0 | 5.1 | 5.4 | 75.5 |
| Netherlands | 2 017.36 | 4.8 | 54.6 | 12.4 | 28.2 | 1 508.60 | 3.3 | 23.0 | 22.5 | 51.3 |
| New Zealand | 67.76 | 2.3 | 35.7 | 10.4 | 51.6 | 90.70 | 1.3 | 25.3 | 7.9 | 65.5 |
| Norway | 1 738.36 | 2.1 | 22.1 | 16.8 | 59.0 | 1 394.96 | 2.2 | 38.6 | 21.4 | 37.7 |
| Portugal | 30.83 | | 30.9 | 0.3 | 68.8 | 16.83 | 0.0 | 26.7 | 0.7 | 72.6 |
| Spain | 337.96 | | | 0.2 | 99.8 | 598.02 | 12.2 | | 0.2 | 87.6 |
| Sweden | 941.24 | 7.5 | 54.1 | 9.7 | 28.8 | 835.54 | 2.3 | 51.6 | 12.1 | 33.9 |
| Switzerland | 3 492.10 | 2.1 | 10.4 | 2.9 | 84.6 | 3 302.20 | 1.7 | 12.2 | 3.1 | 83.0 |
| United Kingdom | 3 390.84 | 14.7 | 64.1 | | 21.1 | 4 466.47 | 15.4 | 67.3 | | 17.3 |
| United States | 4 835.77 | 10.3 | 41.2 | 2.6 | 45.9 | 5 138.54 | 9.2 | 43.0 | 2.5 | 45.3 |
| **Total** | **4 0523.76** | | | | | **43 234.22** | | | | |

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